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Archiv fuer die gesammte Physiologie.

Centralblatt fuer praktische Augenheilkunde.

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THE AMERICAN JOURNAL OF OPHTHALMOLOGY.

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No. 1.

EXENTERATIO SIVE EVISCERATIO BULBI.

BY GEORGE F. FISKE M. D.,

Volunteer Assistant in the University Eye Clinic in Halle, Germany.

This operation, as a substitute for Enucleatio Bulbi, was introduced by Prof. Alfred Graefe of Halle, and described by him in an address delivered before the Society of German Naturalists and Physicians in Magdeburg in September, 1884. This address, to be found in the voluminous proceedings of the Society, is not accessible to American ophthalmologists, and this fact is my excuse for again describing the operation and the grounds for its introduction, while a position for nearly a year as volunteer assistant in Prof. Graefe's clinic has enabled me to take notes of a number of cases which will, perhaps, be of some interest. Statistics show that enucleation is a by no means perfectly safe operation. Prof. Graefe has collected in Europe ten cases of meningitis following the operation, in seven of which death occurred, in only two of the cases was panophthalmitis present and in two more it was threatening. In America several cases have been published and it is highly

probable that both in America and Europe a number of cases have not appeared in print. In view of the fact that the operation of enucleation is never, except in case of malignant tumors, performed as a means of saving life, this considerable number of deaths renders it an earnest question whether there be another method of operating which shall be a sure preventative against sympathetic ophthalmia (so called) and at the same time bring the life of the patient into no danger. Prof. Graefe states the facts in his address as follows:

"In a certain number of cases, although the percentage is very small, the *Enucleatio Bulbi* is followed by a meningitis usually ending fatally. This is also true when we exclude from the operation all those eyes in which panophthalmitis is present. When a panophthalmitic eye is operated the immediate cause of the meningitis is to be sought in the operative procedure and it is still undecided whether, and in what manner, the panophthalmitis exerts an influence.

The meningitis is developed by propagation from a septic irritation of the wound along one or more of the ways of communication leading to the cranial cavity. The present methods of antiseptics are powerless to prevent this fatal accident. The cause of the irritation is probably infection of the wound. In a case of Prof. Leber's he was of the opinion that the inflammation followed the orbital veins into the cranium and in a case in my clinic which was microscopically examined the inflammation seemed to have traveled along the intravaginal lymph spaces of the optic nerve, the walls of which were swollen."

The *Neurotomia opticociliaris* was thought at the time of its introduction to fulfill the conditions previously stated, but time has shown that it is not to be relied upon as a preventive of a sympathetic ophthalmia, that the irritability of the ciliary region and sensibility of the cornea often returns within a longer or shorter lapse of time after the operation, and this procedure has now few advocates. It has long been asserted by pathologists that in cases of sympathetic ophthalmia the sclera plays an indifferent role, and the long series of experiments carried out by Prof. Deutschmann, of Göttingen,

(see Graefe's Archives for 1884) speaks in support of the view that the infectious matter coming into the eye from without is propagated in the ciliary body, and thence makes its way either directly through the corpus vitreum or by way of the choroid to the optic nerve and thence to the other eye along this nerve. In case this view of the indifference of the sclera be true it can only be of advantage to leave the sclera in position and *avoid opening the capsule of Tenon*. The chief advantage of the exenteration over the enucleation are:

1. There is no wounding of the ways of communication between the orbit and cranium, specially of the lymph sheath of the optic nerve by means of which, as has been previously stated, the inflammation following the operative lesion is propagated.

2. The stump which is obtained is much superior to that of the enucleated eye. The artificial eye has a greater extent of motion.

Operation.—Chlorform is always administered, though Dr. Fodor has once performed the operation with use of cocaine and with very little pain. The simplest and most speedy method of operating is to cut through the sclera near the corneal edge with a scalpel, complete the removal of the cornea with a fine pair of shears, remove the contents of the bulbus with a small and sharp spoon, and draw the conjunctiva together with a tobacco-pouch suture.

As it is, however, often very important to obtain the contents of the eye-ball *in situ*, the operation is now always performed in Professor Graefe's clinic in accordance with a modification by Dr. Bunge, the first assistant. With a small and sharp scalpel or cataract knife, the operator cuts carefully through conjunctiva and sclera two or three m.m. distant from the corneo-scleral margin, until the dark pigment of the choroid comes into view, when a pair of fine scissors is introduced and the scleral cut completed at the same distance from the cornea, and without injuring the choroid. A thin stiff spoon with square instead of sharpened edge, and shaped to the form of the bulbus, is then introduced between sclera and choroid, pushed slowly back to the optic nerve, and the contents of

the bulbus in toto removed—spooned out. The conjunctiva is then brought together as before by means of a tobacco-pouch suture, or better, by three common sutures of catgut. The operation is performed under continuous inundation with a solution of corrosive sublimate 1 in 5,000. It is of course not always possible to remove in toto the contents of the bulbus, as there are often old scars and the choroid adheres to the sclera, in which case the remaining choroid is removed with the scissors or sharp spoon. In case the patient complains of severe pain upon coming out of the narcosis ice compresses are applied for an hour or two. In many cases there is no reaction at all and the patient can leave the hospital on the third or fourth day. In other cases the reaction is quite severe with swelling of the lids, chemosis and secretion.

In some cases the patient has remained under treatment for more than three weeks, but thus far a useful and painless stump has always resulted. The number of operations since January 1884, has reached 75. In the earlier operations iodoform was used and in the last cases inundation with corrosive sublimate solution, and this seems to have shortened the time required for healing. In the last eleven exenteration with corrosive sublimate the average number of days in the clinic has been seven and a fraction, while in twenty preceding cases treated with iodoform the average was more than eleven days. The objection that exenteration requires a longer stay in the clinic than enucleation has no weight if the exenteration can exclude the cases of death following the enucleation, and this question can only be determined by long experience. Painful stumps, through irritation of the ciliary nerves, occur occasionally following enucleation, and if they be sometimes found after exenteration this cannot condemn the operation; as yet, however, no instance of a painful stump has occurred: the ciliary nerves are, probably at least, as well protected from irritation when the sclera remains as when it is removed. As regards case of operating neither method has an advantage over the other.

The exenteratio bulbi cannot entirely replace the enucleatio. In cases of malignant tumors glioma, sarcoma, etc., where the sclera is affected the enucleation, or the exenteratio orbitæ,

must be preferred to the evisceration. With this exception in favor of tumors the exenteration can always be performed, in cases of panophthalmitis, phthisis bulbi where sympathetic ophthalmia is to be feared, irido-choroiditis, staphyloma corneæ, injuries, painful and amaurotic eyes resulting from glaucoma, etc. It is also worthy of mention that Prof. Dr. Mulder in Gronigen, Holland, and Dr. Mules of Manchester, England, have, at a later date than, but independently of, Prof. Graefe, been led to recommend the operation of exenteratio bulbi.

Upon Dr. Mulder's recommendation Dr. Daubauton, in Groningen, has experimented with success upon rabbits, and Dr. Mules has performed the operation several times with success in his private practice.

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4. "Exenteratio Bulbi volgens Dr. Mulder," by J. D. Daubauton. *P. Noordhoff. Groningen*, 1884.

5. "Zur Pathogenese der Sympathischen Ophthalmie," by Prof. R. Deutsehmann, *Graefe's Archiv. f. Ophthalmologie*, 30. Jahrgang, Abtheilung III, p. 77.

CASE I. Boy, Arnolf Huyras, 5 years of age. R. normal, L. pseudoglioma. Suppuration in the corpus vitreum and beginning phthisis bulbi, following an injury with a match six months before, a piece of phosphorus having penetrated the eyeball. V.=0, eiliary region slightly sensitive, eviscerated August 4, 1884. Tobacco-pouch suture and iodoform.

Aug. 5. T. 37.8 C. Slight swelling and slight secretion, which quickly disappeared under the influence of warm cataplasms.

Aug. 14. Stump without irritation and with good mobility, artificial eye introduced. Two months later *status idem*.

CASE II. Max Haase, 22 years old. R. Phthisis bulbi following conjunctivitis gonorrhoeica. V.=0.

L. V. = Schweigger 5 at 5 metres. i. e., normal. Ophthalmoscopically normal. Complained of mouches volantes.

Jan. 3, 1885. R. eviscerated; continuous inundation with corrosive sublimate solution 1 in 5,000. and three loose sutures.

Jan. 4. No fever and no swelling; slight secretion.* The ophthalmoscope shows no signs of retinal œdema in the left eye.

Jan. 7. Dismissed as healed.

CASE III. Louise Ludwig, 18 years old. R. leucoma adhærens, and for that reason iridectomy performed nine years ago. Fresh irritation present and V. = figures 2 inches high at 3 metres distance.

L. anterior synechiæ and old corneal scars. Cataracta secundaria nondum matura. Secondary glaucoma with deep excavation of the optic disk. Tension much increased; V. = motions of the hand perceived in the outer third of the field of vision. Irritation and severe pain.

Dec. 14, '84. Sclerotomy performed with abatement of pain and irritation.

Dec. 29. Right eye more irritated. Left eye irritated and painful. Tension greater than before the sclerotomy. L. eviscerated. Corrosive sublimate solution and ordinary sutures.

Dec. 30. No pain and no swelling; slight secretion (continuing three days). T. 38 C.

Dec. 31. T. 36.7.

Jan. 3. Stump ready for dismissal. Remains on account of the right eye, which improves, and is dismissed January 13 as healed. R. V. Schweigger 24 at 5 metres.

CASE IV. Carl Weigert, 36 years old. L. Injury through a gunning accident, charge of shot in the head. Eyelids greatly swollen. Chemosis; hyphæma; cornea perforated.

Dec. 29, '84. Eviscerated; corrosive sublimate solution. Ice compresses for two hours.

Dec. 30. T. 37.8 C. Great chemosis, considerable secretion and pain. Ice compresses.

Dec. 31. T. 36.6 C. No pain. The chemosis requires several times incision and warm cataplasms are applied twice a day for an hour at a time.

Jan. 9. Dismissed as healed.

CASE V. Friedrich Tauche, 19 years of age. Injured two weeks before by a beet thrown against the left eye. Beginning phthisis bulbi, a broad scar in the sclera below the cornea. Pupil contracted and iris saturated with blood, V. = 0.

Jan. 20, '85. Eviscerated. It was impossible to remove the contents of the bulbus in toto. The choroid at the site of the scar in the sclera had to be removed from the sclera with shears and a sharp spoon. Corrosive sublimate solution. No fever and but slight swelling and secretion followed.

Jan. 27. Dismissed as healed.

CASE VI. Julius Schreiber, aged 44. L. Phthisis bulbi following an injury in November 1884, on the 5th of January, he first noticed that the right eye was affected and presented himself January 13, with a broad posterior synechia in the lower part of the pupil, and a considerable diffuse cloudiness of the corpus vitreum; marked circum-corneal injection. Pupil contracted. V. = Schweigger 12 at 5 metres, i. e., not quite $\frac{1}{2}$. A well marked case of irido-choroiditis—of so called "sympathetic ophthalmia."

Jan. 14, '85. The left eye, which was amaurotic, exenterated under the same precautions as above. Corrosive sublimate solution and three sutures.

Jan. 15. No reaction and in three days the patient was ready for dismissal so far as the exenteration was concerned. At once upon his reception the patient entered upon a vigorous course of treatment in the attempt to save the eye affected with sympathetic ophthalmia. Atropine, heurteloup and inunction with ung. hydrarg. ciner. Upon the day after the evisceration there was a distinct improvement; less atropine was required to maintain the mydriasis, and the cloudiness in the vitreous had so far disappeared that the optic disk, upon the first examination with difficulty distinguishable, was seen in almost its normal distinctness. Vision also improved. The treatment was continued, and on February 3 V. = Schweigger 9 at $5\frac{1}{2}$ meters, a slight circumcorneal injection still present and very faint cloudiness of the vitreous. It is of course impossible to predict the outcome at present. It is not at all improbable that the lingering, sneaking irido-choroiditis will retain its hold and, perhaps after many

months, increase and lead to phthisis. The case is, however, interesting as being the first evisceration done on account of well marked sympathetic ophthalmia, and as indicating that the evisceration certainly does not injure the patient's chances and perhaps increases them.

GLAUCOMA PRODUCED BY ATROPIA.

BY D. D. COGGIN, M. D., SALEM MASS.

The danger of atropine to eyes predisposed to glaucoma has long been noticed.

But the notes of the following case from the clinical records of the writer are given not wholly in the belief that the very moderate action of the weak solution of the atropia sulphate that was employed was alone the cause of the acute glaucomatous attack that ensued.

It is quite possible that the state of mental excitement that is often noted on the part of patients while in the consulting room (and which was not absent in this one) was as important a factor as the use of the atropine in occasioning the trouble in this instance.

Oct. 18., 1884, Mrs. I., an American, age 68 years, complained of failingsight, which was first noticed one year before. No pain V.=Sn. LX. at 4. O. D. XXXVI. at 4. O. S. with + D. 1. 5= XVIII. at 4. O. S. No glass helped O. D. With her glasses she read Sn. 1. easily O. S. Pupils normal T=1 O. U. and incipient cataract. Fundus normal, O. S. and, as faintly seen through the diffuse opacity in the lens, O. D. also. Field of vision good. On instilling a drop of atropine solution (0.03-30. 0.) the vision of O. D. rose to Sn. XVIII at 4. which gratified the patient so much that she was advised to use it whenever she should like to.

She insisted on being told as to the nature of her trouble but she left feeling quite hopeful.

On Oct. 21, her son said his mother had suffered much and the right eye had become blind. On examining the eye it was found to present all the symptoms of acute glaucoma. V. quantitative. No view of the fundus was got. It appeared that two days before, while at breakfast, severe pain appeared in the eye, with nausea, and loss of sight, and it lasted till the afternoon of the 20th. An iridectomy was declined. A two per cent solution of eserine sulphate was used and within half an hour the pupil was well contracted, though with the usual tearing pain that its use occasions.

Oct. 24, Eye quiet. Still red. T. +1. V. fingers at 0.75. Pupil irregularly contracted, with +1. 5. = Sn. 6. at 4. O.S. again since the first consultation. Eserine advised p. r. n.

ANÆSTHESIA OF THE RETINA.

DR. S. C. AYRES, CINCINNATI.

The following cases of retinal anæsthesia are reported not because there is anything especially new in them but rather because they confirm a course of treatment which has been almost without exception successful. Two of them may be attributed to uterine disturbances, but in the third this was probably not the case. The prompt recovery of vision in these cases and the infrequency of relapse would indicate that this phase of hysteria, if it may be correctly classed as such, is very amenable to treatment. The symptoms as they develop are certainly sufficient to excite alarm even in the stoutest heart. In the first case the amblyopia came on while she was sitting in church and suddenly everything around her was shrouded in darkness and gloom. So much was her vision impaired that she could not recognize objects around her. Such a sudden advancement of amblyopia is in my observation not common.

CASE I. S. S., æt 26, gave the following unique history. She went to church one morning with, as she supposed, perfect vision in both eyes, at least up to date they had never given

her any trouble. After she had been seated a while she found that she could not see to read, and she soon found that she could see only the shadow of the minister. She could see persons sitting near her but could not recognize them. Ten days later I first saw her and found that she was only able to count figures at 6". Her field of vision was contracted to about 10° by the perimetre. She could very imperfectly see large objects in a room but could not recognize her friends. She could not read Sn. at any distance with the most favorable light. Fundamentally her eyes appeared sound and the pupils were active and responded to light. I gave her a hypodermic injection of strychnia and in fifteen minutes she could read Sn 100 at 6." and in thirty minutes could see the letters in Sn. 40. She was sitting in the office at this time and voluntarily said that her sight was returning and was as much surprised as she was delighted at the effect of the treatment. Next day January 18, her field of vision increase to 15° horizontal by 20° vertical. She was able to read Sn. 15 at 8". Gave second injection and in half an hour she read Sn. 2½ O. D. or 1 O. S. and her field of vision widened to 25° vertical by 20° horizontal.

January 19, $V = \frac{1}{x}$ U. O. and reads Sn. 3½ O. S. and 5 O. D. before injection. There was a gradual improvement in vision up to February 1, when it became perfect in both eyes and the field of vision normal in extent. From the 1st to the 12th, of February her vision varied but little, being nearly perfect every day. On the latter day it fell to $\frac{1.5}{xx}$, but in thirty minutes after the injection of strychnia it again came up to 1 in either eye. The same thing occurred on the 13th and 15th, the vision improving promptly after the use of the injection.

On the 16th, however, she could count fingers at only 1', with the O.D. and the field of vision was correspondingly contracted. O. S. $V = \frac{1.5}{xL}$.

On the 17th, 19th, 20th, and 21th, the r. e. remained about the same. The injection had but little effect on vision it remaining as on the 16th.

February, 22, 23 and 24. Counts fingers at 18" O. D. O. S. $V = \frac{1.5}{xL}$.

February 28, $V = \frac{1.5}{Lxx}$ O. D. and $\frac{1.5}{xx}$ O. S. After injection $V = \frac{1.5}{L}$ O. D. and $\frac{1.5}{xx}$ O. S.

With slight variations from day to day there was still an improvement and March 10, $V = \frac{1.5}{xL}$ O. D. and $\frac{1.5}{xx}$ O. S. After injection $V = \frac{1.5}{xx}$ O. D. and $\frac{1.5}{xv}$ O. S.

March 15, $V = \frac{1.5}{xx}$ O. U. Gave injection as usual but it seemed to have no effect.

March 16, $V = \frac{4}{c}$ O. U. and cannot read '20 Sn. with either eye and field of vision reduced to about 10° .

Here was a sudden fall in her acuity of vision in a single night without any assignable cause. There was no ophthalmoscopic change in either eye and her pupils were responsive to the influence of light.

From the time I lost sight of the patient, as I suppose, she became discouraged by the fluctuations in her acuity of vision.

There seemed to be nothing more than the hysterical element in the case, and it is more than likely that a continuance in the treatment would have given her relief. There seemed to be no menstrual disturbance in this case at first, although there was some uterine displacement, I think a prolapsus. She had suffered from headaches for three or four months previous to the first attack of blindness.

CASE II.—Miss C., æt. 16, gave the following history in brief. About three weeks ago, she took cold during a menstrual period and menstruation was suddenly checked. This was followed by a feeling of languor and lassitude with pain in her back and limbs. She also noticed that she could not use her eyes comfortably. They soon grew tired and she could not read any length of time. Soon her sight began to fail for objects around her and she seemed to be in a fog. This grew more dense until finally she could scarcely see to go around alone. When first examined she could not see to count fingers at any distance with either eye. There was concentric contraction of the field of vision it being reduced to 12° horizontal by 10° vertical by the perimeter. The pupils responded to light and the fundus in each eye appeared perfectly sound and healthy.

I began the use of strychnia hypodermically and ordered grs. ij Vallett's mass three times a day. There was no improvement in central vision until after the fourth treatment, but the field of vision expanded to twice its diameter.

Feb. 1. Counts fingers at 3'. Gave injection strychnia.

P. M. Counts fingers at 5'.

Feb. 2 and 3. Vision same, field of vision slightly enlarged.

Feb. 4. $V. = \frac{1}{LXX} O. U.$

Feb. 5. $V. = \frac{1}{XL} O. U.$

Feb. 6. $V. = \frac{1}{XV} O. U.$ and reads Sn. 1 at 10". Injections discontinued.

In this case there was a gradual improvement first in the widening of the field of vision and second in acuity of vision. In ten days the recovery was complete and so far as heard from there has been no relapse. The sudden suppression of menstruation was here the active factor in causing the anæsthesia, for she could not be called hysterical, and always enjoyed excellent health.

CASE III. Miss K., a healthy well-developed young lady of 16, suddenly lost the sight of the left eye. She could assign no sufficient cause for it, as her health had been excellent. There was concentric contraction of the field of vision and she was able to count fingers at a short distance, but exact vision was not noted. Her right eye was perfect for distance with no orthemic symptoms. Rest from her school studies was recommended, and she was ordered liberal doses of potassium bromide. In about two weeks she quite recovered full use of the eye with perfect vision.

This is one of the exceptional cases where only one eye is involved. The ophthalmoscope revealed no changes in the fundus. Her recovery was prompt and permanent.

In Vol. XI *Archives of Ophthalmology* MOOREN in an exhaustive article on *Disturbances of Vision and Uterine Disease* mentions a case reported by Samelear where "a young woman of 21 had to work standing with bare feet at the time of her menses. The sudden menostasis caused a disagreeable sensation of pressure behind the eyes the same evening. Within a month she was completely blind. The ophthalmoscope showed nothing but a strong retinal reflex and a slight enlargement of the veins. In another week her sight returned." It was his opinion that the blinding was the result of a compression on the occipital lobes caused by venous stasis.

In the proceedings of the *Ophthalmological Society* for 1875 Dr. E. Williams reports three cases of *Retinal Anæsthesia*. The first was in the person of a young lady of 24 in vigorous health who had attacks of blindness coming on every day and lasting only a few minutes each time. There was concentric contraction of the field of vision in both eyes and marked diminution in the acuity of vision.

The recovery was slow, as she was under observation for two months. The blind spells became less frequent, and the field slowly enlarged, and her ability to fix her eyes on an object improved. She was treated with injections of *strychnia sulph.* hypodermically. There was no disturbance of menstruation or other cause to account for the anæsthesia.

In his second case the patient, a married woman of 38, was subject to chronic dysentery. She was the mother of eleven children at the age of 28, which is quite enough to shock the strongest constitution.

There was concentric contraction of the field of vision. At the same time there was intense photophobia, showing a *hyperæsthesia* combined with an *anæsthesia* of the retina. She had momentary attacks of blindness and could not trust herself to walk alone as her field of vision was so much contracted. She was at times very much reduced in strength by the dysentery, which seemed to be very unmanageable.

The strychnine injections were tried, but they caused nausea and headache and had to be discontinued. Quinia, iron and other tonics were resorted to, but all to no avail. When last heard from she was still suffering from attacks of dysentery, which, added to her mental depression, made the outlook very unpromising.

The third case was that of a boy 10 years of age. He awoke one morning to find that he could not see to recognize the members of his family. He went to school that day, but could not see to study. Ten days later he came for treatment. He is a delicate nervous boy and has had pain through his temple for a year or two. Though of slender figure and anæmic look his general health has been good. He counts fingers with O. D. at 6' and not at all with O. S. Field of vision very much contracted O.

U. Given strychn. sulph. gr. $\frac{1}{50}$ hypodermically. At 4 p. m., six hours after injection, *field of vision was complete* but central vision had not improved.

The next day he read Sn. 70 at 4"; after third treatment read Sn. 20 at 3". After sixth read No. 8 slowly; after ninth reads No. 5 slowly. Went home and twenty-four days later returned with V. = $\frac{1}{2}$ O. U. and ability to read Sn. 1. One month later vision had increased $\frac{3}{4}$ and he could read Sn. 1 rapidly. In this case as in others we first notice an improvement in the field of vision.

In the proceedings of the ophthalmological society, for 1882, Dr. Richard H. Derby of New York reports a very interesting case of retinal anæsthesia in a girl eight years of age recently convalescent from an attack of scarlet fever. Vision O. D. 0.6, O. S. 0.5. There was concentric contraction of the field of vision, it being reduced in either eye to about 10° by the perimeter. She was first ordered small doses of oxide of zinc, and ordered to wear coquilles.

Two months later her vision was reduced to 0.2 O. U. and fields limited, as at first. The optic discs appeared paler in their outer halves than before. Inhalations of the nitrite of amyl were now resorted to with excellent results. In ten days vision was and the fields were enlarged, but it was not until nine days later that the fields were considered normal. In this case the acuity of vision improved more rapidly than the field of vision enlarged. Under the strychnine treatment the fields widened first, and the acuity of vision returned later. In this case there were signs of partial atrophy of the optic nerve, but the recovery of vision was complete under the influence of the nitrite of amyl.

In the discussion which followed the reading of Dr. Derby's paper, Dr. Henry D. Noyes reported a remarkable case in a man 55 years of age. While talking he began to lose his sight, and in ten minutes was blind, and had to be led home. Complete abolition of sight lasted from 2 p. m. until 6 a. m. the next day, when it began to return. Twenty-four hours after he lost sight he was first examined, and had V. = $\frac{2}{20}$. He was put under the influence of nitrite of amyl, and in five minutes he had completely recovered. V. = $\frac{20}{20}$.

A REPORT OF TWENTY-SEVEN CONSECUTIVE CASES
OF SENILE CATARACT OPERATED BY THE VON
GRAEFE MODIFIED LINEAR EXTRACTION.¹

BY A. R. BAKER, M. D.,

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I presume there is no case of cataract extraction which does not present some points of interest; but as it would consume too much of your valuable space to attempt to give anything like a complete report of each one of the twenty-seven cases, I have prepared a table by which at a glance you will be able to determine the sex, age, date of operation, anæsthetic used, general condition of patient, the eye operated, duration since cataract became mature and results of operation. It will be observed that the general condition of most of the patients at the time of the operation was good so that the cases to a certain extent may be said to have been selected.

I wish to call your attention to a few of the cases which presented some points of unusual interest, after which I will give a short analysis of the cases; and in conclusion draw your attention to some general statements about the advisability of operating cases of senile cataract at the homes of the patients; and mention some of the difficulties I have met with in so doing. The statements with regard to length of time since cataracts were mature are approximate, as I was usually compelled to depend upon the statement of the patient, which is often very indefinite. I am, however, well satisfied that in my limited experience the right eye has become cataractous before the left in at least 70 or 80 per cent. of the cases; I have seen no statistics on this point.

The results of the operation were usually noted two or three months after the operation.

1. A partial report of these cases was read before the Northwestern Ohio Union Medical Society at the meeting at Akron, Ohio, February 3, 1884.

No.	Sex.	Age.	Date of Operation	Anaesthetic.	General condition	Eye Operated.	Duration since Maturity.	Results. (Snellen).
1	M	72	1883. Sept. 12.....	Ether.....	Good	R*..... L.....	4 years..... 1 year.....	$\frac{20}{1}$
2	M	54	Sept. 14.....	None.....	Good	R*..... L.....	1 year..... Immature..	$\frac{20}{\infty \times}$
3	F	60	Sept. 15.....	None.....	Good	R*..... L.....	2 years..... 1 year.....	$\frac{20}{\infty \times \times}$
4	F	87	Oct. 14.....	None.....	Good	R*..... L.....	9 years..... 5 years.....	$\frac{20}{L \times \times}$
5	F	70	Oct. 18.....	Ether.....	Good	R*..... L.....	3 years..... 3 months....	$\frac{20}{L \times \times}$
6	F	60	Nov. 18.....	Ether.....	Fair	R*..... L.....	4 years?..... 4 years.....	$\frac{20}{L \times \times}$
7	F	54	Dec. 15.....	Ether.....	Poor.....	R*..... L.....	7 years..... 4 years.....	$\frac{20}{L \times \times}$
8	M	64	1884. Jan. 15.....	Ether.....	Good	R..... L*.....	2 years..... 10 years.....	$\frac{20}{\times L}$
9	F	60	Mar. 10.....	Ether.....	Good	R*..... L.....	2 months.... Immature...	$\frac{20}{\times \times}$
10	M	72	Mar. 10. ...	None.....	Good	R*..... L.....	1 year..... 1 year.....	$\frac{20}{L \times \times}$
11	F	76	Mar. 12.....	None.....	Good	R..... L*.....	1 month..... 1 year.....	$\frac{20}{\times L}$
12	M	80	Mar. 14.....	Ether.....	Fair	R..... L*.....	6 months.... 5 years.....	$\frac{20}{L \times \times}$
13	M	50	Mar. 16.....	Ether.....	Good	R*..... L.....	4 years..... 1 year.....	$\frac{20}{\times \times}$
14	M	40	Apr. 18.....	Ether.....	Good	R..... L*.....	Immature... ?.....	$\frac{20}{\times \times}$
15	M	68	Apr. 21.....	Ether.....	Fair	R*..... L.....	2 years..... Immature...	$\frac{20}{\times \times \times}$
16	M	63	Apr. 24.....	Chloroform	Good	R*..... L.....	3 years..... 1 month.....	$\frac{20}{\times \times}$
17	M	82	May 17.....	None.....	Good	R..... L*.....	1 year..... 2 years.....	$\frac{20}{L \times \times}$
18	M	78	May 18.....	None.....	Good	R*..... L.....	3 years..... 2 months....	$\frac{20}{\infty \times \times}$
19	M	46	May 21.....	Ether.....	Good	R*..... L.....	1 year.....	$\frac{20}{\times \times \times}$
20	M	77	June 5.....	None.....	Good	R*..... L.....	4 years..... 4 years.....	$\frac{20}{\times L}$
21	F	55	June 21.....	Ether.....	Good	R..... L*.....	3 months.... 2 years.....	$\frac{20}{\times \times}$
22	M	56	June 27.....	None.....	Good	R*..... L.....	1 year..... 1 month.....	$\frac{20}{\times \times}$
23	F	59	Sept. 11.....	Ether.....	Good	R*..... L.....	1 year..... Immature...	$\frac{20}{\times \times \times}$
24	M	48	Sept. 17.....	Ether.....	Good	R*..... L.....	2 months.... 2 months....	$\frac{20}{\infty \times \times}$
25	M	54	Nov. 16.....	Ether.....	Good	R..... L*.....	Immature... 2 months....	$\frac{20}{L}$
26	F	66	Nov. 18.....	None.....	Good	R..... L*.....	11 years..... 11 years.....	$\frac{20}{\times \times}$
27	F	75	Nov. 21.....	None.....	Good	R*..... L.....	5 years.....	$\frac{20}{\times \times}$

CASE VI. Progressed nicely until the morning of the fourth day, when by mistake of the nurse the attending physician dropped carbolic acid into the eye, causing a very severe conjunctivitis; a very intense iritis followed, which was controlled by cold applications, leeching and atropia. Vision $\frac{20}{150}$. The pupil is immovable. Patient expresses himself quite satisfied with the result and will not submit to needling, which would improve her vision somewhat.

CASE VII. The hygienic surroundings were very bad, and I operated the case under protest. The next day after the cataract extraction three children came down with diphtheria and were confined to the same room with the mother, who also had quite a severe attack of diphtheria commencing about two weeks after the cataract extraction. She also suffered from a severe iritis, and was confined to her bed for three months. I saw the case at the end of that time and fitted spectacles. She was able to read $\frac{20}{150}$ easily. Since that time she has been gradually losing her vision and at present, December 15, 1884, can only see about $\frac{20}{60}$, the result of a secondary cataract forming, which can be benefited by needling.

Since writing the above I have received a letter stating patient's clothes accidentally caught fire and before it was extinguished she was so severely burned that she died in a few hours.

CASE XI. The vitreous was fluid. When I touched the capsule with the cystotome the lens performed a somersault back into the vitreous. I carefully passed a scoop behind the lens and removed it in its capsule, with very little escape of vitreous. Result most satisfactory.

CASE XII. There were two small posterior synechiae in the left eye, resulting from an old iritis. I included the synechiae in my iridectomy and delivered the lens without accident. There are very extensive synechiae in the right eye.

CASE XIX. Had a preliminary iridectomy performed by a New York oculist two or three years previous. A purulent iridocyclitis had developed the next day after the operation. Extraction perfectly satisfactory.

In connection with this case I wish to state that during the

past year I have met one other case in which a preliminary iridectomy had been performed by Dr. Mittendorf, and the eye had been lost in the same way. I expect to operate on the other eye of this patient soon.

These two cases have caused me to look upon "preliminary iridectomies," so fashionable at present, with some suspicion. I have not been able to see the propriety of subjecting a patient to the risk and inconvenience of two operations; when in selected cases, with experienced operators, and when the operation is completed in one sitting, the loss is not more than from one to four per cent., I doubt if simple iridectomies could present a better showing. [!Editor] In cases with increased tension and where the general condition of the eye would be improved I have made it a rule to perform a preliminary iridectomy. Also in cases of immature cataract in which patients have insisted on having "something done," and for fear of losing the case I have performed preliminary iridectomies, with no ill results, and at the same time kept the confidence of my patient and increased my fee. [!Editor] I rather suspect this is the secret of the popularity of this operation. It satisfies the patient and keeps the case until such time as the lens is in condition to be removed.

CASE XXVII. Progressed satisfactorily until the beginning of the third week. Patient was left alone for a short time during the afternoon; when the family returned to the room she was found unconscious on the floor and remained so during the night. She regained consciousness the next morning, but had complete hemiplegia of the left side. This gradually improved and almost entirely disappeared in five or six days. The case presented no other unusual symptoms and rapidly progressed to complete recovery. Vision $\frac{20}{60}$. Pupillary space large, clear and key-hole shaped. Iris active. Retina and vitreous healthy. Patient says she never saw acutely with the eye operated on. There was a corneal ulcer with considerable purulent secretion from other eye. There was also a large pterygium of either eye and a slightly divergent strabismus.

An analysis of the above twenty-seven cases shows that sixteen were males and eleven females. Ether was administered to fifteen, chloroform to one; hydrochlorate of cocaine was used

in one case, and nine cases were operated upon with no anæsthetic. The right eye was operated on in nineteen cases and the left in eight.

When corrected with lenses

8	of the above cases could read (Snellen)	-	-	-	$\frac{20}{XX}$
6	“ “ “ “	-	-	-	$\frac{20}{XXX}$
3	“ “ “ “	-	-	-	$\frac{20}{XL}$
2	“ “ “ “	-	-	-	$\frac{20}{L}$
7	“ “ “ “	-	-	-	$\frac{20}{LXX}$
1	“ “ “ “	-	-	-	$\frac{20}{C}$

There was no corneal complication in any of these cases and only two cases of iritis.

The twenty-seven extractions may be arranged as follows, grouped according to age:

Age.	No.	Visual Results.					
		$\frac{20}{XX}$	$\frac{20}{XXX}$	$\frac{20}{XL}$	$\frac{20}{L}$	$\frac{20}{LXX}$	$\frac{20}{C}$
40-50..	3	1	2				
50-60..	8	4	1		1	2	
60-70..	6	3	2	1			
70-80..	6		1	2	1	2	
80-90..	4					3	1
	27	8	6	3	2	7	1

It will be seen the youngest was forty, and the oldest eighty-seven and the average age about sixty-four.

For reasons not necessary here to state almost all of these cases were operated at the homes of the patients and left under the care of the family physician. The uniform good results will I think justify me in saying that it is not necessary for these old patients to leave the comforts of home and the cheerful surroundings of friends. The long journey, the change of diet and surroundings and all this change means in eating, drinking, sleeping, exercise, associations, etc., cannot but have a depressing influence upon our old patients and must often outweigh

the benefits arising from better nursing, improved hygienic surroundings, etc.

I do not wish to be understood that I would prefer to operate these cases at their homes and leave them under the care of the family physician, but I wish to say that I think it is perfectly safe to do so, and I wish to call the attention of the profession to those old people who have been blind for years, who are old and feeble and not able to take a long journey, who are practically dead and who only exist in the minds of their most intimate friends and acquaintances who have to supply their daily wants. There are such cases in almost every community.

I was very forcibly impressed by a remark made by Dr. Lawson one day at the Moorfields Ophthalmic Hospital, London, Eng. An old man was operated on by Dr. Lawson one morning. On the evening of the same day the old gentleman took offense at one of the nurses, because of some restriction, and by some means escaped from the hospital, got on top of an omnibus, rode four or five miles, got down and entered the Middlesex Hospital; and would give no account of himself. He was found at the end of two or three weeks at the Middlesex Hospital, by Dr. Lawson, and made an excellent recovery. After relating this case at length, Dr. Lawson remarked "I am becoming impressed more and more every day with the fact that the success of cataract extractions depends upon the operation itself and not on the after treatment."

It is the practice of Dr. Lawson, as well as of most of the English surgeons after cataract operations, to not disturb the dressing, if there is no pain or other indication of inflammatory trouble, until the end of the third or fourth day. Most German oculists open and examine and instill atropia every day. Prof. Jaeger, of Vienna, with whom I spent considerable time, always removed the dressings and examined the eye very carefully twice daily. It gave me an excellent opportunity to watch the progress of the cases from day to day, but I am certain it was not to the best interests of the patients. I have no statistics on this point but from my observation, which extended over several hundred cataract extractions both in England and Germany. I am certain iritis is more frequent with the latter.

One practical disadvantage I have met in operating at the homes of the patients is the need of trained assistants. I have been very much surprised to find how few physicians know how to administer ether. The physician is afraid of it and soon communicates his fear to his patient, and the one reacts upon the other so that the results are very prejudicial. I have been compelled time and again to take the anæsthetic from a good physician and administer it myself. I have found comparatively few physicians who can fix an eye without pushing the fixation forceps against it. I have no doubt our increased clinical advantages, together with post-graduate teaching, will do much to remove these difficulties.

TRANSLATION.

The following translation seems to be of some interest in connection with Dr. Fiske's paper in the present number.

It is taken from *Zehender's Klinische Monatsblätter f. Augenheilkunde*, Jan'y, page 49 and sequ., and written by Prof. Graefe, in Halle, as an answer to a criticism by Prof. Manz, in Freiburg, i. B., on a previous paper on exenteratio bulbi by the same author. We have omitted all personal matters.

* * * Concerning the autopsy in two cases of meningitis after enucleatio bulbi, he says that longitudinal sections made of the optic nerve showed that no inflammatory process could be traced in the parenchyma of this nerve ascending from the wound, the enucleation had caused; but the pia mater was enormously infiltrated with cells, especially in the direction toward the canalis opticus. On this fact I based my opinion that the meningitis was due to the propagation of the inflammatory process by way of one of the channels leading from the wound upwards, *i. e.*, by way of the intra-vaginal lymph-space. * * *

* * * I am satisfied that there is no difference in the operative technical difficulties of the exenteratio bulbi, as I have described it on the one, and the enucleation of the eye from Tenon's capsule on the other hand. Yet, the former procedure

is decidedly the superior one with regard to simplicity and to the final result, since it affords of much more favorable conditions for the wearing of an artificial eye, than does the enucleation. * * *

* * * We have a priori a right, according to the present state of our knowledge, to see in the removal of the intra-scleral parts, which give the soil for the development of propagating inflammation, as certain a preventive means as we do in the emmucleation. * * *

* * * I have stated that the process of healing after our operation is a varying one; that the healing is often by first intention and that in other cases a considerable reaction (swelling of lids, chemosis, secretion) take place. In the former case the patients can be discharged on the third to sixth day; in the latter case, the reconvalescence usually lasts until the end of the second week, but this is solely due to the fact that the chemosis which prolapses through the palpebral fissure must yet be locally treated after all other symptoms of irritation have disappeared. * * *

* * * The healing after an enucleation, too, is not always perfectly smooth, and sometimes this operation is followed by symptoms of irritation similar to those after exenteration. Moreover, this operation is made in a number of affections, which, without being interfered with by an operation, would require a prolonged period for their cure, as in recent cases of hopeless injuries, in the beginning or at the acme of a panophthalmitis, etc. If such eyes are enucleated, in spite of all unfavorable considerations, the reaction, as a rule, is more severe and the healing more tardy than is the case after exenteration. But, granted that the healing after the latter operation often actually takes a few days more than after the former one, how can this be thrown into the scale against the gains expected from the exenteration, viz., a better stump and the safeguard against meningitis! * * *

* * * I took occasion to report ten cases of severe meningitis due to enucleation, which in the majority of these cases actually caused death. This statement was based on what I had learned from the literature of about twenty years, as far as

it came to my knowledge. But it is only too probable that the actual number of lives lost after enucleation is considerably larger. One of the few members of the ophthalmological section at the meeting of *German Naturalists*, Dr. Howe, reported a case in which death ensued after an enucleation made by him on account of phthisis dolorosa. * * *

* * * As Jacobson states, that, since he enucleated under the carbolic spray, he has had no more occasion to see meningeitic symptoms after this operation, we may well conclude that he has formerly had occasion to see them. I do not doubt that many a one has been prevented from publishing such cases, by being afraid of bringing the observations of such unfortunate results into general knowledge. Such action is unjustifiable, though it may well be understood. I myself have during my professional career performed enucleation of the eye approximately 600 times and seen, as already stated, death from meningitis following it in two, *i. e.*, one-third per cent, of these cases. The consideration of this subject becomes extremely painful when we think that, with the exception of the formation of tumors, this operation is never done as serving an *indicatio vitalis*, but solely to remove different affections which we cannot otherwise get rid of, or to prevent an affection of the fellow-eye, which is not even sure to make its appearance, or even merely for a cosmetic effect. It seems to me, therefore, that there are reasons enough why we should look about us for a substitute for the enucleation, although it is considered to be a classical operation.

Halle, Dec. 1884.

ALFRED GRAEFE.

In the December number of the *Centralblatt f. Praktische Augenheilkunde*, Dr. Elizabeth Sargent, of San Francisco, publishes the results of the microscopical examination of six glaucomatous (three primary and three secondary) eyes, made at the Pathological Institute of the University of Zuerich.

The following are some of the points of interest:

* * * The optic nerve was cut into transverse sections. I made fifty-seven sections, one thousandth of a millm. in thickness,

										Primary.	Secondary.
Choroid	{	Normal	-	-	-	-	-	-	-	2	0
		Some Formation of Thrombi	-	-	-	-	-	-	-	0	1
		Inflamed in Front of Equator	-	-	-	-	-	-	-	1	0
		Generally Changed	-	-	-	-	-	-	-	0	2
Retina	{	Well Preserved	-	-	-	-	-	-	-	2	0
		Atrophied	-	-	-	-	-	-	-	1	0
		Cystic Degeneration near Ora serrata	-	-	-	-	-	-	-	3	0
		Highly Atrophied and Degenerated	-	-	-	-	-	-	-	0	3
		Detached	-	-	-	-	-	-	-	1	2
Optic Nerve	{	Cupped	-	-	-	-	-	-	-	3	3
		Excavation Filled with New Formed Connective Tissue	-	-	-	-	-	-	-	1	0
		Showing Cell-infiltration and Atrophy	-	-	-	-	-	-	-	3	2
		Simple Atrophy	-	-	-	-	-	-	-	0	1
		Perineuritis	-	-	-	-	-	-	-	2	1

In summing up the results of these examinations we find the cardinal points viz., excavation of the optic nerve and obliteration of the iris-angle in *all* cases, whether they be of primary or secondary glaucoma. The infiltration with cells in the anterior parts of the sclerotic and the participation of the cornea in the process, especially in the area of the palpebral fissure, are equally constant.

There is an important difference between the conditions of the retina in the primary and in the secondary cases, at such a late stage of the disease, not to mention the changes in the choroid. In the primary cases the retina is well preserved, or only shows premature senile alterations, in the secondary cases it is degenerated to the highest degree.

The infiltration of the optic nerve behind the lamina cribrosa (found in the majority of the cases), of the tissue around the *vasa centralis* and even of the intra-vaginal spaces, is also of great importance.

* * * What has been found at this late stage of the disease, can, however, only reservedly be counted with, and we can only say that it seems to be of great moment for the explanation of a large number of cases of glaucoma, to examine carefully into the conditions of the sclerotic, especially its anterior portions, and of the blood-vessels of the retina and optic nerve.

EDITORIAL NOTICE.

We are informed that some of the members of the Moorefields Ophthalmic Hospital staff in London have arranged to give short courses of instruction in Ophthalmoscopy, Refraction and External Diseases of the Eye. The next series of these courses will begin early in May, and there will probably be another early in October.

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No. 2.

A CASE OF ANOMALOUS CENTRAL RETINAL BLOOD VESSELS—ATROPHY OF THE OPTIC NERVES.

W. HUNICKE, M. D., ST. LOUIS, MO.

Mr. A. M., from the State of Illinois, aged 56, consulted me on October 9, 1884, on account of impaired vision.

He is a farmer by occupation, has served during the war and acquired the alcoholic habit to which he has been addicted ever since. He does not recollect of having had a disease of any kind. The family record is apparently good with the exception of that of his aged mother who has been blind for many years from a cause unknown to the patient.

Status præsens.—Patient is tall, well developed. Face puffed, cheeks and nose striated with dilated capillaries. Lower lids and conjunctiva bulbi slightly œdematous. Scleral veins enlarged and somewhat tortuous. Irides are grey, showing perfectly the outer and inner circles with the intermediate crypts and trabeculæ. Anterior chambers narrow. Pupillary margins somewhat jagged, but no posterior synechiæ nor are there pigmented deposits on the lens capsule as remains of former adhesions. The pupils are greyish, myotic and react slowly upon light.

By oblique illumination it is seen that both corneæ are clear, no opacities are found in the aqueous humor, and no pathological changes on the anterior capsule or in the immediately adjacent portions of the lens.

In examining the lens-system by means of reflected images, I find the corneal and the posterior capsular images normal, but I am unable to discover the anterior capsular image. This is, probably, due to the myotic condition of the pupil which brings the three images into close proximity and thereby causes a suppression of the anterior capsular image by the powerful corneal reflex. The posterior capsular image is clearly discernible in the entire pupillary field.

Upon dilating the pupil *ad maximum*, the fundus is seen perfectly clear and no traces of opacities behind the lens are to be found.

Examining the optic nerve O. D. in the direct method with Landolt's ophthalmoscope, using a plane mirror, I considered its size normal, possibly somewhat diminished. The shape of the optic papilla is round, it is bordered with an accumulation of dark brown pigment at the upper and inner quadrant. The scleral ring is clearly visible in its entire circumference. The peripheral portions of the optic papilla show a very faint reddish color to the width of a semi-radius; this color gradually increases in intensity towards the center and it ends in an abrupt margin at the middle portion of the optic nerve, which is excavated, intensely white and studded with bluish well marked irregular spots.

The central blood vessels pass from the retina over the scleral ring into the peripheral portions of the optic papilla in the same plane, stopping abruptly at the margins of the excavations; their color becomes intensified and they change their direction somewhat and gradually disappear through the lamina cribrosa. Arteries as well as veins are somewhat tortuous; the former are reduced to two-thirds of their normal caliber. In regard to the origin and distribution of the blood vessels there is nothing particular to relate excepting the following, viz: that the vena temporalis inferior instead of being distributed over the inferior temporal region of the retina, forms a ramus recurrens. Com-

ing out of the lamina cribrosa with the other blood vessels, it follows about its usual course up to the margin of the excavation, when after having made an abrupt bend outwards, it runs almost midway between the margin of the excavation and the periphery of the optic papilla and very nearly parallel with the scleral ring. (See figure 1.)

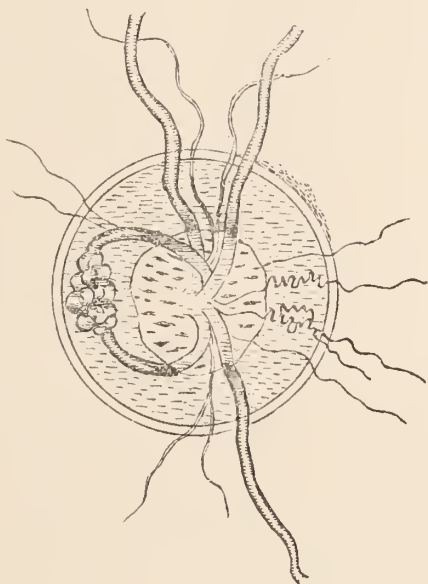


Figure 1.

After having traveled upon the disc over a space of about one-fourth of its diameter, the vein forms a cluster of tortuosities, all of which combined assume the shape of a mulberry of about one-fifth of the size of the disc lying close to the peripheral portion of the optic papilla. The contours of the whole and of each individual convolution are exceedingly plane, showing in every convolution a central reflex and two dark red lines on each side as is characteristic of an ordinary blood vessel.

This feature, however, is planest upon the more superficial ones. Pulsation is marked, but I am unable to say, whether the wave of pulsation, starting from the cluster, went towards the

center by way of the vena temporalis inferior or by the superior recurrent portion.

The recurrent portion passes inwards in a curve until it reaches the temporal margin of the vena temporalis superior, then passing over it to the margin of the excavation makes a sharp bend towards the center of the papilla and is lost in the physiological excavation between the vena temporalis superior and the vena nasalis superior.

On the nasal side of the disc, two small veins are seen, which also show very marked tortuosities while passing over the peripheral portion of the papilla. The lower one gives off a branch which behaves in the same manner. V=fingers at $2\frac{1}{2}$ metres.

The peripheral portions of the optic papilla lie nearly in one plane with the inner surface of the surrounding retina. However, the central light portion of the optic disc, to the extent of about one-half of it, is as stated very much excavated.

Correcting my own myopia by a—4 D lens, I am able to see the fundus of the excavation with its vessels and nerve bundles distinctly. Next, observing the non-excavated portion of the disc and the adjacent retina, both of which, as I have stated above, were practically in the same plane, I find that—2.50 D corrects the refraction. In looking at the summit of the cluster of blood vessels on the optic papilla—1.75 D gives me a clear picture. Thus I may derive the following conclusions, viz., that the distance from the anterior pole of the cornea to the most excavated portion of the optic papilla is equal, or very nearly so, to the optical axis of an emmetropic eye, that the fundus of the eye and the peripheral portion of the optic nerve present a hyperopia (or shortening) of +1.50 D, or $\frac{1}{24}$ old series, and furthermore that, in order to see the cluster of vessels distinctly, an additional lens of +0.75 D was necessary, which showed a second shortening.

Having found hyperopia 1.50 D or $\frac{1}{24}$ old series as the refractive condition of the non-excavated portion of the optic papilla and knowing also the refractive condition of its excavated portion and of the surface of the cluster of blood vessels, it is an easy matter to compute their distances from each other, referring

to H. Knapp's "Table, indicating the ophthalmoscopic determination of the shortening, resp. elongation, of the ocular axis by means of positive, resp. negative, auxillary lenses," published in Knapp-Moos' Archives of Ophthalmology and Otology, Vol. III., No. 2, Page 19.

The non-excavated part of the optic papilla compared with the fundus of the excavation which shows H 1.50 D or $\frac{1}{24}$, the ocular axis must be shortened 0.467 mllm., or, what is essentially the same thing, the excavation of the optic papilla must be 0.467 mllm., deep. The height of the cluster of blood vessels being seen by an additional +0.75 D or $\frac{1}{48}$ lens, this shows a shortening of 0.322 mllm. of the ocular axis, or in other words, the cluster of vessels is 0.232 mllm. high.

Perimetric examination reveals a concentric diminution of the field of vision, but no scotoma.

The other eye shows a physiological excavation with atrophy of the optic nerve.

CASE OF RETINAL HÆMORRHAGE APPARENTLY DUE TO SIMPLE ANÆMIA, WITH REMARKS.

BY J. F. FULTON, M. D., PH. D.,

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Hospital.

Although cases of retinal hæmorrhage are frequently met with as the result of various obstructive troubles of the circulation and serious diseases giving rise to organic disorders of the walls of the blood vessels, and of pernicious anæmia. All authorities agree that it is a very rare result of simple anæmia; so scarce indeed that but few well authenticated cases have been reported and with some of these there has been the suspicion that the hæmorrhage might have been due to other causes. It is this interesting factor in ætiology of retinal hæmorrhage together with a perfect recovery of sight after a severe effusion of blood at the yellow spot which renders the case worthy of publication.

Miss R., aged 26, was sent to me by Dr. Briggs of this city. She was somewhat feeble, but a careful examination of her physical condition revealed no other trouble than that of simple anæmia. And the cause of the anæmia was not apparent as she never had been the victim of any profuse loss of blood; her digestion was good, although appetite rather captitious. There was no history of malaria or of any constitutional disorder, but the blood was watery and deficient in red corpuscles. The other indications of anæmia were the palor of her lips and tongue, the weak and somewhat accelerated pulse, the rapid production of fatigue by exercise. But she did not complain much and thought her general health quite good. There was no murmur over the heart nor anything to indicate disease of that organ, except slight palpitation after excitement or upon exertion. A few days before coming to me for advice, just as she was coming out of a cold bath she noticed that a large scotoma showed itself suddenly before the right eye and that she could not see anything distinctly with that eye. At the time of the examination the acuteness of vision in the eye was $\frac{20}{60}$; of left eye $\frac{20}{30}$. The ophthalmoscopic examination showed that both eyes were emmetropic and that the background of the left eye was perfectly healthy, but it revealed a large fan-shaped hæmorrhage of the right eye, entirely obscuring the macula lutea and extending towards the optic disc. It was dark purplish in color. There was but the one hæmorrhage. The disc and retina were pale, and the blood vessels rather more transparent than normal.

She complained much of the annoyance which the scotoma gave her, but insisted that her sight was perfect before this accident happened.

As the above notes indicate, no other cause could be found to account for this young lady's trouble than that of simple anæmia, and it was with that idea in view that she was treated. She was put upon full doses of iron and a rich and liberal diet, under which she rapidly improved. We were gratified to notice that the hæmorrhage became thinner from time to time and the acuteness of vision slowly but surely improved, and that the scotoma changed its color and became "thinner" from day to day. The clot of blood became decolorized centripetally and

could be noticed becoming less and less dense at each successive ophthalmoscopic examination.

Hæmorrhages in the region of the yellow spot are worthy of our most careful study, on account of their frequent occurrence and very great importance; as they not infrequently produce a permanent defect in the acuteness of vision. In such cases, however, it is likely that the effusion takes place into the deeper layers of the retina and results in a disorganization of the tissue and consequently a loss of function. In those cases, like the one reported, in which there is a complete recovery of sight and no permanent lesion remains at the seat of the hæmorrhage, we must assume that the blood lay between the vitreous body and retina, or upon the inner surface of this tunie.

The ophthalmoscopic appearance of the apoplectic spot gave this impression as the retinal blood vessels could not be seen behind the clot, but, had the hæmorrhage taken place into the choroid, these blood vessels would not have been hidden from view.

Wolfe, in referring to this subject in his work, makes the following practical conclusion: "That ophthalmoscopic appearance does not always coincide with the extent of the retinal lesion. Thus, sometimes, we are surprised to meet with a case of complete abolition of sight while the ophthalmoscope shows only a serous transudation; and, on the other hand, in cases where vision is very slightly affected, we notice extensive apoplectic patches within retinal sclerosis." I am inclined to think that a more careful study of the relation of the blood clot to the retina as to depth will assist us greatly in giving a more correct prognosis. None of the usual causes of retinal hæmorrhage was present in this case. There was no history of injury, no derangement of the vascular system, none of the graver alterations of the blood, such as albuminuria, hæmorrhagic diathesis, diabetes, or leucoeythæmia, etc. There was nothing to indicate inflammatory change of any kind. Dr. Stephen Mackenzie in a paper read before the Ophthalmological Society of the United Kingdom narrated a series of carefully studied cases which seemed to indicate that a tendency to retinal hæmorrhage was produced wherever the corpuscular richness of the blood

fell below 50 per cent, thus indicating that anæmia is one of the causes of retinal apoplexy.

Dr. Henry Juler in the *Ophthalmic Review* quotes Dr. Gowers as saying that in simple chronic anæmia retinal hæmorrhages are "very rare, and probably only take place where there is a great absolute deficiency in the number of red corpuscles."

Although no estimate of the percentage of red blood corpuscles was made in the case I have here reported, yet judging from the facts that the patient was anæmic, that all other causes of retinal hæmorrhage were absent, that the patient improved rapidly under large doses of iron, I think that this can be classed without hesitation as one of retinal effusion of blood, the result of simple anæmia.

MISCELLANEA FROM PRACTICE.

ADOLF ALT, M. D.

I.

AN UNUSUAL CASE OF ATROPINE POISONING.

On October 16, 1879, Miss J. McF., æt. 39, consulted me on account of floating shadows, light-flashes, and gradually increasing dimness of vision in both eyes. These symptoms had become more aggravated for about six months previous to her visit, and she dated their origin from the 6th of April, the same year, on which day she had taken a severe cold. Her eyes got inflamed at the same time, were red and painful, and remained so for a prolonged period. At the same time she had, moreover, an eruption of the skin all over her body. (When consulting me, patient was engaged to be married to a clergyman, and wanted her sight restored before the marriage, which was set for a not distant day.) Although everything pointed to a specific disease, I could not elicit anything further from her, and the physician who had sent her to me considered such a thing as absolutely impossible, and my diagnosis as absurd.

Status præsens.—Outward appearance of the eyes normal. Anterior chamber O.U. shallow, pupils small. V. in R.E. = $\frac{20}{LXX}$, in

L.E. $\frac{2}{6}$ difficult. R.E. reads Jäger 8 with difficulty. After the instillation of atropia there appeared in the L.E. a posterior synechia of the iris downwards. The periphery of the lens was dim, striated. The optic disc was swollen and whitish infiltrated, its outlines invisible; the retinal veins were tortuous, but arteries and veins as far as seen appeared very small, owing to a thin exudation that apparently covered them. Floating opacities. In the R. E. the vitreous was generally dim. Optic papilla and retina were in the same condition as in L.E. Glands of the neck swollen and hard.

I felt satisfied that the former iritis, as well as the optic neuritis now, was a specific affection, and I told the lady, without mentioning the real cause, that she would have to undergo a vigorous treatment for a constitutional ailment, of which her eye affection was but a symptom. The physician who had brought her to me insisted, as I said, upon my being mistaken in the diagnosis; and I heard nothing further of the case until March 13th of the next year, when she unconditionally accepted vigorous anti-syphilitic treatment, which consisted of mercurial inunctions, iodide of potassium in half-drachm doses three times a day, leeches to the temples, rest in bed and a dark room.

Under this treatment the vitreous body cleared up in both eyes, and on the 27th of that month the outlines of the optic papillæ were plainly visible. On the 30th the fundus of the L.E. was apparently normal, while in the R.E. there was yet a slight haziness, and the retinal veins were as yet tortuous.

Thus everything was going on well, when on April 1st I was sent for at 10 P. M., on account of very alarming symptoms, which had set in during the forenoon. I found her slightly delirious, the face hot and flushed, skin dry. The pulse was 92 and fluttering, irregular. She complained of severe headache and dizziness, a dry throat and heavy tongue, and spoke very slowly. Her limbs were numb, and her menses had appeared before their time. Her pupils were dilated *ad maximum*, the fundus of both eyes appeared exactly as it had done two days before.

She had not had any atropine or belladonna by my order, either internally or instilled into the conjunctival sac; but she had

had a bottle with iodide of potassium refilled the preceding day, and taken several doses of this medicine.

The question was now whether all these symptoms were due to anatomical changes in the cranial cavity (gumma, malignant tumor, etc.) or not. The condition of the optic nerves in both eyes being absolutely unchanged, I did not think it probable that an intra-cranial affection had caused these alarming symptoms. The next probable thing then was that she was poisoned by belladonna or atropia. Two things, however, spoke against this diagnosis, viz: The comparatively slow pulse, and the fact that no belladonna in any form had been prescribed.

I, therefore, being somewhat in the dark, gave her simply a subcutaneous injection of morphine, had an icebag applied to her head, and discontinued all other medication. The bottle I quietly put into my pocket.

The next morning I found patient was considerably improved. She had vomited several times during the night, and had fallen asleep at 7 A. M. Her face was no longer flushed, she talked rationally, though yet slowly and with a heavy tongue. Pulse regular, 60. Pupils the same as before. The numbness of the limbs was gone; she only complained of a "globus" in her throat.

April 3d.—All the symptoms have nearly disappeared. The pupils are beginning to contract. Fundus U.O unaltered.

April 10th.—V. is $\frac{20}{LXX}$ O.U., reads Jäger 5 with difficulty. The fundus in both eyes appeared normal.

I had the iodide of potassium solution examined by a reliable chemist, who made his analysis without knowing of the case in consideration. He reported that the solution contained atropia and iodide of potassium.

II.

A CASE OF POISONING BY DUBOISIA

Mr. E. M. D., æt. 32, came under my treatment on account of a severe non-specific iritis of the right eye.

He was put to bed in a dark room, atropine was instilled and leeches were applied. Whenever pain came on some instillations of a four per cent cocaine solution were made and they relieved him

usually. His pupil not being fully dilated after several days of atropine instillations (about 1 per cent.) every half hour, and because his conjunctiva seemed to show some atropine granules, I changed the mydriatic into duboisinum sulfuricum of the same strength, to be instilled every hour.

This solution the patient received in the evening at nine o'clock, and he used *three* drops of it, according to his own statement and actual measure.

At midnight the nurse noticed that he was talking wildly, looked flushed, and tossed about in his bed, and, therefore, removed all his medicines from him. In the morning he jumped out of bed and tried to run off, but fell down powerless. His brother who had accidentally dropped into the hospital to see how he was doing, came running to me, perfectly satisfied that his brother had gone crazy. Not being able to go at once and see the patient myself, I sent the brother back to the hospital to have the patient given morph. sulf., gr. $\frac{1}{8}$, and chloral. hydr. grs. 15, every half hour. This was at 11 A. M. I also send for a colleague to see the patient with me in consultation, but did not succeed in doing so.

At 2 P. M. I saw the patient myself and found him in a slight slumber. His face was yet flushed, his pulse 136, skin dry. He complained of very severe headache, dry throat and mouth, and told me that he had to talk nonsense, although he knew it was such and tried hard to help it, and he begged of me to help him over this fearful condition.

For a moment I thought I would give him large quantity of muriate of pilocarpine hypodermatically, but seeing that five doses of morphine and hydrate of chloral of the strength above mentioned had actually quieted him and seemed well to counteract the poisonous effect, I concluded to keep on giving these anodynes at longer intervals.

When I saw him in the evening he had had a short sleep; but his pulse was yet 112 and he yet talked delirious. The nurse said, he was getting more restless again. I therefore ordered her to push the morphine and hydrate of chloral with precaution, until the patient should fall soundly asleep. This was finally succeeded in after the patient had again taken six-eighths of a grain

of morphinum sulfuricum and one and a half drachms of hydrate of chloral.

He slept from midnight until morning without waking and then dozed nearly all day, but was easily aroused. His pulse was 84 and the dryness of the skin had given way to a slight moisture. All symptoms of poisoning gradually disappeared.

As the solution of duboisinum sulfuricum contained gr. 2 to 3ss of water and he had used of this solution just 3 drops, he had been poisoned by three doses of gr. $\frac{1}{20}$ or gr. $\frac{1}{40}$ in all, and it took not quite gr. 2 of morphine and 3½ of hydrate of chloral to get him into a safe condition.

The second day I began again to have atropine (gr. 4 to 31) instilled and no further disagreeable symptoms occurred.

III.

A CASE OF KERATITIS PHLYCTÆNULOSA OF LONG STANDING, HEALED AFTER ENUCLEATION OF THE PHTHISICAL FELLOW EYE.

W. H., 8 years of age, was brought to me July 27, 1879, with a history of phlyctænular keratitis which had then existed for four months in the L.E., and for something over three months in the R.E. There was swelling of the lids, lachrymation, pain, photophobia, and blepharospasmus. As it was impossible to examine the eyes without an anæsthetic, I put the boy under the influence of chloroform.

Status præsens.—R.E.: Considerable injection of the conjunctival vessels, two phlyctænulæ near corneoscleral margin. Large central ulcer. L.E.: Cornea very vascular. Large perforation lying somewhat eccentrically, iris protruding through it. Margins of ulcer infiltrated with pus. Protruded iris yellowish discolored. No anterior chamber. T=—2.

I removed the prolapse at once with the scissors, and put the boy under the usual treatment of cold applications, yellow oxide of mercury ointment and atropia. The ulcers in both eyes healed rapidly. In the L.E. the basis of the healing ulcer, however, gave way several times again to the increasing intraocular pressure. No further protrusion of the iris, however, occurred.

August 10th.—The anterior chamber in L.E. refilled. Both eyes very irritable. New phlyctenulæ in R.E.

This condition remained about the same for a short time. Then the L.E. began slowly to lose its vision. The R.E. got alternately better and worse.

September 9th.—L.E.: Visual field eoneentrically constricted. T=—3. Adherent leucoma, beginning phthisis anterior.

As the phthisis of the L.E. progressed it became totally blind,



Figure 2.

and remained irritable and tender to the touch. The condition of the R.E. did not alter, in spite of the treatment.

A month afterwards I therefore concluded to remove the L.E. After this was done the photophobia of the R.E. and the formation of phlyctenulæ ceased at once. The boy had no relapse during the year following. Since then I have not heard of the case.

The clinical aspect of this case has many features in common with the cases which have by several authors been described as cases of sympathetic keratitis, and the result of the operation is

such that it looks as if we had in such cases really to deal with a sympathetic affection of the cornea, or at least that a shrunk and chronically inflamed eye can keep up an existing affection of the fellow by sympathetic influences.

The removed eyeball had several interesting features. I had thought that the retina must be found detached to its whole extent. But to my astonishment the macroscopical specimen showed no detachment of this membrane. Under the microscope, however, there were found innumerable—so to speak—microscopical detachments of the retina, caused by the exudation of (if I may so express it) small drops of a gelatinous material between choroid and retina. This exudation was found to lie either between the pigmented epithelium and the choroid, or between the pigmented epithelium and the retina.

A further uncommon feature, which is shown by figure 2, was that a considerable amount of blood was found within the lens-capsule. This membrane had probably been ruptured at the time when the perforation of the cornea had occurred. The opening was, however, so small that I could only find it with great difficulty. The infiltration of the lens-substance with blood had apparently taken place, also, at the same time, when the rupture of the lens-capsule had occurred since no hæmorrhage was found in what existed still of the vitreous body. Otherwise the lens-substance appeared unaltered.

IV.

CATARACT EXTRACTION FOLLOWED BY DEATH.

A case of death after the extraction of a cataract is certainly a rare occurrence, and, as I know of only one further case, communicated to me in correspondence with one of the leading operators, I think it may be well to put my unfortunate experience on record.

On October 14, 1880, Mr. W. C., ætat. 80, consulted me on account of loss of vision in both eyes, which had been gradually coming on during the last four years.

I found the gentleman to be healthy and strong for his age, and walking quite firmly. In both eyes I found a mature nuclear cataract. Pupils dilated well upon instillation of atropia. Ten-

sion, as well as function of the eyes normal. I advised extraction of one of the cataracts, and was called upon to perform this operation on October 18th.

I made a large corneo-scleral section and a large iridectomy. When the latter was completed, some bleeding into the anterior chamber took place. After the lens-capsule was opened I attempted the expulsion of the lens, but found that the corneo-scleral wound, though larger than average incision, was not sufficiently large to admit of the passage of the immense, hard and unelastic cataract. I therefore enlarged the wound with strabismus scissors, and attempted again to expel the cataract, when the patient gave a sudden jerk, and the cataract became dislocated upwards and backwards. After two or three attempts at reposition of the lens into the patellary fossa with a sharp hook, I succeeded in doing so, and then extracted the lens with the spoon with but a very slight loss of vitreous body. During the last steps of the operation the wound-lips were considerably bruised. After a few minutes of rest the patient counted fingers and could tell the time by the watch.

October 19th.—Had a tolerable night; slight pain; no undue irritation. 8 P. M.—Some mucoid discharge; no pain. A small bead of vitreous body in the corneal wound; cornea hazy; wound lips slightly infiltrated; no anterior chamber; some cortical substance in pupillary space; iris discolored.

October 20th.—Had a good night; no pain; no swelling; some muco-purulent discharge on the cotton; no chemosis; infiltration of the wound-lips more marked on the temporal side; shows well defined margins. 8 P. M.—Wound closed; some anterior chamber; some œdema of the conjunctiva; no pain; less discharge.

October 21st.—Had a good night; very little discharge; œdema of the conjunctiva; there is some necrotic material lying in the outer angle of the wound; anterior chamber larger; pupil not contracted; pupillary space clearer.

October 22d.—Had a very bad night on account of “weak spells” and atropia excitement(?); no discharge; no pain; less infiltration. Champagne.

October 23d.—Cornea clearing; wound-lips nearly free from infiltration; no discharge; pupil large, filled with cortical substance.

October 24th.—Wound clean; the patient counts fingers by candle-light close by; he eats a good meal with relish. To my surprise I found him at 9 P. M. exceedingly weak; tongue heavy; talks perfectly rational. Champagne.

October 25th.—Patient is very weak, and lies in a stupor, from which he is aroused with difficulty; he takes no food. Consultation with Dr. A. J. Temple; brandy enemata and ammonia.

October 26th.—8 A. M.—Patient has been slowly sinking during the night; œdema of lungs. 9 A. M.—Death.

The patient had never any fever; septic infection is, therefore, to be excluded. What caused his death, and whether his death was directly due to the cataract extraction, is a question I cannot answer. How dark the case remained to the consulting physician was shown by his certifying that death had been the result of “*secondary collapse*,” whatever that may mean.

TRANSLATION.

The following is a translation of parts of a paper on movements of the cones and pigmented epithelial cells of the retina under the influence of light and the nervous system, by Th. W. Engelmann at Utrecht, which appeared in the *Archiv f. die Gesamnte Physiologie*, etc.

* * * The inner segments of the cones become shorter when influenced by light and become elongated in the dark.

When the inner part contains a so-called ellipsoid, this does not, or at least comparatively little, change in form. The same is the case with the outer segments of the cones and with the rods. It seems that only that part of the inner segment of the cones is actively movable, which most resembles protoplasm and which lies between the membrana limitans externa and the outer segment. In this movement the moving part remains always in continuity with its cell-body in the outer granular layer. When it becomes shortened it gains in thickness, when it is elongated it becomes thinner in such a manner that probably no change

in volume takes place. In this it corresponds with contractile protoplasm or muscular fibres.

The absolute and the relative amount of the change in length of the cones differ in the various animals which have been examined, and they may differ very materially in the cones of one and the same eye and under the same conditions. * * *

* * * The rapidity of the movement is such that in frogs (which have been kept in the dark), the cones previously stretched *ad maximum* may be contracted *ad minimum* after having being exposed to diffuse daylight for several minutes only. If the animal is exposed to *direct* sunlight less time is required.

It seems that the elongation after sudden darkening generally needs a longer time than the contraction. It has not yet been possible to measure the time exactly. But, from what has been reported with regard to the frog, it is evident that the rapidity is of the same order as that of the movement of many forms of contractile protoplasm, for instance, that of the pigmented cells of the skin, of the contractile cells of the corneal epithelium, and especially of the pigment granules in the protoplasmatic offsets of the pigmented cells of the retina in the same animal.

Since the pigmented cells of the retina under the influence of the same light move in general to the same degree and in the same direction as do the cones, we might suppose, that both movements were due to the same cause, in such a manner that one could not occur without the other. There are, however, conditions in which the cones may be contracted *ad maximum*, while the pigment granules do not change the position they were in while in the dark, and vice versa.

It seems that all parts of the *visible* spectrum can produce this photo-mechanical reaction of the cones, if their action has only been sufficiently long and strong. * * *

* * * We have not yet examined whether the *invisible* (infra-red and ultra-violet) rays can call forth the same reaction. * * *

* * * We can conclude, that the place of the primary irritation lies inwards from the division between the outer and inner segment of the cones. Further experiments have made

it even very probable, that this place lies within the inner segments themselves, or better, in their contractile protoplasmatic substance. * * *

* * * These facts prove that the movements of the cones and of the pigmented cells of the retina are directly dependent upon the nervous system.

The author's attention was drawn to the possible existence of such a dependence by the fact, that when one eye only of a frog, previously kept in the dark, was exposed to light, the cones and pigmented cells were found in the position of maximum contraction near the limitans externa in the retina of the eye not so exposed. The only difference between the two was that the outer segments of the rods in the exposed eye were perfectly bleached, while in the unexposed eye they were as intensely tinted as if the frog had not at all been exposed to the light.

By repeating this experiment it was found that this photo-mechanical reaction of the pigmented cells and cones takes place in equal strength and at the same time in both eyes, when one only is exposed to light, and that when shielded from the light both resume their former positions *pari passu*. This was the same in bloodless, even in decapitated, frogs, when the brain was uninjured, at least a short time after the bleeding from decapitation. Later on the cones assumed more and more the contracted form in a similar way as do other contractile organs during "spontaneous" death.

When the brain had been destroyed by means of a knife or needle the influence of the light affected only the exposed eye. We can, therefore, exclude a direct aktinic irritation of the unexposed eye by light which might reach it from the exposed eye.
* * *

* * * On the contrary, we are forced to assume an association of the cones and pigmented cells of both eyes by way of the nerves, *i. e.*, a "sympathetic" co-action of the two retinae.

According to our present anatomical knowledge such an association can only be brought about by the optic nerves. Therefore these nerves act not only as centripetal nerves which conduct the sensation of light to the brain, but also centrifugally as motor nerves for the cones and pigmented cells of the retina.

It is not probable, that the sensitive as well as the motor impulses travel by way of the same nervous fibrillæ. * * *

* * * Since this association of the two retinae exists not alone in the frog but also in the pigeon (the only animal so far examined), it is undoubtedly of a very general occurrence among the vertebrates and is probably not wanting in man. It is then not impossible that in the latter the fibres of the anterior commissure of the chiasma of the optic nerves (the physiology of which has so far not been understood) have the function of accessory conductors. It is certain at least, that (in the *rana esculenta* and *temporaria*) retino-motor fibres go by way of the optic nerve from the large nerve-centres to the eyeball.

This conclusion was reached by the author, when he tried * * * whether it was possible to produce visible changes in the retina by throwing the light exclusively upon the skin of the body. The first experiment in this direction at once gave a positive result.

The head and trunk of a frog, having been previously kept in the dark, while in the dark were put into an absolutely un-diaphanous cap, made of four layers of thickest black velvet, which could be fastened on him in the manner of a tobacco pouch, and; to be absolutely sure, this again was put into a black, thick carton. Then the back and posterior extremities, while under a stream of water, were exposed for a quarter of an hour to the influence of sunlight.

The eyes which were at once enucleated in the dark and hardened, showed cones and pigment contracted *ad maximum* towards the limitans externa, as if they had been struck directly by the light. Of course, the outer segments of the rod were intensively tinted.

A frog taken from the same box, treated in the same way, but *not* exposed to light, showed in both eyes the common condition of a retina which has been kept in the dark. * * *

* * * One thing is certain, that it is possible to cause a reflex movement in the cones and pigment epithelial cells of the retina by the irritation of distant regions of the body. * * *

* * * On the other hand, the author had occasion to convince himself of the fact, that it is not the light which is abso-

lutely necessary for the production of such movements. The retinae of frogs, kept in the dark, made tetanic by strychnia and killed, showed the same position of cones and pigment, as do retinae which have been exposed to light. The same effect was produced when the eyes of frogs kept in the dark were tetanized, *in vivo*, or at once after extirpation in a dark room, by moderate induction currents. Curare did not diminish the reaction, nor did it produce it.

In the same journal H. Aubert in a paper entitled: Does the Curvature of the Cornea Most Resemble an Ellipse? comes to the following conclusions:

* * * Is the cornea curved symmetrically, or does its curvature change at intervals? We must answer in the affirmative with regard to the nasal side, and state, that the cornea towards the nose becomes very rapidly flattened, whilst about 12 degrees to both sides from the optical axis the curvature is about equal. We are, therefore, forced by these observations to acknowledge two zones of different curvature, a marginal zone and a polar zone. The flat marginal zone goes over into the nearly symmetrically curved polar zone with a rapid increase in curvature.

Thus we can distinguish between two zones in the cornea, of which one, the marginal zone, remains in accordance with the anatomical conditions of the eye-ball, while the other, the polar zone, serves the optical requirements. The form of the eye-ball is such that the part defined by the sclerotic is almost spherical with a radius of from 11 to 12 mllm.; the margin of the cornea having almost the same curvature as the sclerotic is a direct continuation of the sclerotic. This part then passes over gradually into a part of the cornea of a stronger curvature in a zone of the cornea which is immaterial for optical purposes, since the rays falling upon it are kept from entering the eye-ball by the iris. It is only where this sclerotic curvature of the bulbus is totally changed, that the part of the cornea begins which is material for vision and which lies in an area of from 12 to 16 degrees around the optical axis. The curvature of this part is such that by it the rays of light are refracted in such a manner as to unite upon the retina. We may, there-

fore, call the polar zone of the cornea its *optical* zone, and the marginal zone its *sceral* zone. Their limits are given by the iris and pupil.

D. Waldhauer in an article on four cases of diabetic cataract published in the *Revue Générale D'Ophthalmologie* makes the following remarks:

O. Becker in his book on the crystalline lens has given more consideration to the diabetic cataract than any of the writers on the same subject. He states, and I can confirm it from the seven eyes I operated upon, that the opacity lies with preference in the cortical substance and that the nucleus is comparatively transparent.

I have also been struck by the ease with which it is separated from the cortical substance. The cataracts had very quickly become ripe and in two cases regressive metamorphosis had rapidly taken place. I have not seen in my cases any particular swelling of the cataract, nor the changes in the pigment of the iris, which are described by O. Becker and Hirschberg.

The results of the operations in the four patients may be considered very favorable and as good as we can wish them to be in cases of normal senile cataract. The corneal wounds all healed very well and in one case even a disagreeable complication (spastic entropion of the lower lid) produced neither irritation nor suppuration of the wound. In spite of the remaining of cortical substance in the anterior chamber, no iritis developed, and judging from my cases, it does not appear to be justified, to give a bad prognosis with regard to the healing after cataract extraction in diabetic individuals. [Case I., read Jaeger No. 5, with $+2\frac{3}{4}$ at 12"; visual acuity not given, but said to be very good with $+4$. Case II., R. E. Jaeger No. 2, with $+2\frac{3}{4}$ and with $+4$ at distance, "as well as he ever had seen;" L. E. (secondary cataract) read Jaeger No. 8 with $+2\frac{3}{4}$, visual acuity not given. Case III., R. E., with $+2\frac{3}{4}$ Jaeger No. 4, for distance selects $+4$, as giving him as good sight as he had in his best days; L. E., does not recognize letters of Jaeger No. 8, with $+2\frac{3}{4}$. Some opacities in pupillary area. Case IV., patient cannot read, but has good vision, of which he will, how-

ever, not allow an exact examination, in order not to lose the subsistence from his community.—EDITOR.]

I have not encountered any complications in the retina or choroid neither before nor after the operation, if I do not want to count here the capsular opacities in the third case. I think it useful to add to my observations a few words on the condition of the suspensory ligament and the hyaloid membrane. In the diabetic subjects I think they are more easily ruptured than in the normal condition. In the first case in which I could not notice any trembling of the iris the suspensory ligament must have been relaxed, because that part of the lens which corresponded with the corneal incision, became dislocated forwards and pressed the iris forwards. I do not think that the ligament was ruptured by a rapid loss of the aqueous humor, because then the vitreous body would have prolapsed and thus the replacement of the prolapsed iris [which was successfully done. EDITOR] could not have been accomplished. In the second and third cases a detachment of a part of the capsule from the suspensory ligament must have taken place and this have been moved into the pupil in consequence of the traction of the cystotome during capsulotomy. In the third case it is possible that in making the capsulotomy the hook attacked the thickened part of the capsule; this would easily explain the rupture of the suspensory ligament. In cases two and four the loss of vitreous body seems to have been due to the tearing of the suspensory ligament and of the hyaloid membrane during the capsulotomy in a part which must have been quite a distance from the corneal wound; had it been near this wound its lips would have gaped.

It seems to me, that in the common senile cataract and even in cases of traumatic cataract, the suspensory ligament is generally more resistant. In diabetes these delicate tissues of the eye, perhaps, become atrophied, more brittle and less resistant. This could explain also the observation made by Hirschberg, that the pigmentary layer of the iris remained behind after an iridectomy. O. Becker does not say anything about the condition of the suspensory ligament in cases of cataract, and I believe it is not very easy to get microscopical specimens of it. My observations, undoubtedly, teach that we must be very care-

ful when operating for diabetic cataract and not force a complete expulsion of the cortical substance, when this is not easily accomplished. * * *

In an article by F. Hoesch on Experimental Studies on Cysts of the Iris, published in *Virchow's Archiv*, we find the following statements:

* * * In four cases minute pieces of skin and hair (from the rabbit) were brought upon the iris and observed during from forty to forty-eight days. In one case no irritation appeared at first, but on the 24th day suppuration took place in the anterior half of the eyeball, which, however, disappeared again in a few days. The anatomical examination made on the fortieth day showed the anterior chamber and the iris filled with pus cells, the lamellæ of the cornea separated from each other by round cells. The foreign body which was nowhere adherent to the iris, consisted of a dense network of hair; in some places a network of fibres was found, having nuclei which were stained deeply by carmine. In the other cases the presence of the foreign body was well born and it led in every case to the same result, viz., to the formation of a large cyst, lined with regular pavement epithelium and filled with an atheromatous substance. This cyst lies in the iris and is attached to the cornea by a fibrous tissue containing stumps of hair and sections of glandular canals. Besides these large cysts we find in most specimens one or more smaller ones with the same lining of epithelium and the same contents.

I think the formation of these cysts cannot be better explained than by assuming them to have been formed within the transplanted piece of skin, in the manner of atheromatous cysts, *i. e.*, by the accumulation of the glandular secretion within the lumen and the orifice of a sebaceous gland. We have, therefore, here, too, to deal with retention cysts. When this process takes place within several adjacent glands, the result may, of course, be a cyst with several chambers, as they have been seen in the iris and been described by several authors.

I would like to go a step further and to give it as my opinion, that even those cysts of the iris which were undoubtedly

formed around cilia, have possibly an analogous origin. * * *

* * * My opinion, therefore, is that the pearl (epidermoid) tumors of the iris as well as the so-called serous cysts of this membrane (and I cannot find a fundamental but only a difference in degree between the two) are usually caused by the fact that during the preceding traumatism parts of such tissue were thrown into the anterior chamber, which enclosed organs apt to retain their contents and secretion. This does, of course, not deny that once in a while the cyst may originate in the manner described by von Wecker or in some other way; but these are then, probably, exceptional occurrences.

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ON OPERATIONS FOR THE PARTIAL OR TOTAL REMOVAL OF THE EYEBALL.

BY JOHN GREEN, M. D., ST. LOUIS.

The recent very warm advocacy of the operation of *exenteratio bulbi*, by Professor Alfred Graefe, as a general substitute for enucleation¹, has suggested the presentation of a few notes, as perhaps not untimely, on some of the operative procedures which have been proposed for the removal of staphyloma and for the prevention or cure of sympathetic affections of the eye.

Wardrop (*The Morbid Anatomy of the Human Eye*, Second Edition, London, 1834, Ch. XLII,) writes.—

“The eyes * * * have a sympathy with each other, both in health and disease, and this is, perhaps, more remarkable between the eyes than any of the other organs, from the two optic nerves being intimately interwoven. Diseases which were originally confined to one eye are transmitted to the second eye; and even when an eye sustains a slight injury, the other frequently becomes weak and irritable.”

“This sympathy between the eyes has not escaped common

1. Excepting, of course, in cases of retinal and choroidal tumors.

observation; and there is a disease, frequent in the eye of the horse, having the appearance of a specific inflammation, which usually first affects one eye and then the other, almost always sooner or later destroying vision. It is known among some farriers, that, if the eye first affected with this disease suppurate and sink in the orbit, the disease does not attack the other eye, or subsides if it has commenced in it. Thus they have adopted a practice of destroying altogether the diseased eye, in order to save the other; which is rudely done done by putting lime between the eyelids, or thrusting a nail into the cavity of the eyeball, so as to excite violent inflammation and suppuration. I have frequently succeeded in saving one eye of the horse by adopting this practice; but I destroyed the eye by simply making an incision in the cornea, and discharging through it the lens and vitreous humor. In some diseases of the human eye, when the disease makes a similar progress, first affecting one eye and then the other with complete blindness, the practice so successful in animals might by judicious discrimination, be beneficially adopted."

"But besides this general consent between the two eyes, there is a striking sympathy between the corresponding textures of each organ. * * * A young man received a wound in the eye which produced violent inflammation of the iris; and in three weeks the iris of the other eye became inflamed."

It appears from this quotation, that Wardrop had a very clear idea of sympathetic disease of the eye, and also that he suggested the true method of combatting it: although he did not discriminate between sympathetic irritation and the more intractable sympathetic iritis and irido-cyclitis, and, therefore, was led to expect greater curative effects from his operation than we now hope for. Wardrop's procedure, of making a free incision of the cornea and "discharging through it the lens and vitreous humor," was in effect a very complete exenteration, at least when supplemented, as it must have been, by general suppuration and destruction of the choroid: its effectiveness in affording relief from sympathetic irritation, and in protecting against the danger of sympathetic inflammation cannot be doubted.

Mackenzie (*A Practical Treatise on the Diseases of the Eye*,

Fourth Edition, London, 1854, p. 411) quotes from the *Medical Gazette*, 1834, a case, of old gun-shot wound of the eye, reported by Dr. Butter, in which the degenerated crystalline lens was first removed, and, a year and a half later, the vitreous humor was let out through an opening made in the sclera: seven months after the latter operation he extirpated the eyeball together with the lachrymal gland, and as much as possible of the optic nerve in which a duck shot was found impacted near its junction with the globe. These successive operations were performed in the hope of affording relief from severe and disabling sympathetic irritation, but this result was attained only after the extirpation. The want of success which attended the extraction of the lens and the evacuation of the vitreous chamber in this case was justly attributed to the insufficiency of these measures to effect the removal of the offending foreign body.

Maekenzie, (*Op. cit.*, p. 412) quoting from Crompton, (*Medical Gazette*, 1837) cites the practice of Mr. Barton, of Manchester, in cases of lodgment of a fragment of percussion cap within the cavity of the eyeball.

“Mr. Barton thinks that the sympathetic inflammation, in these cases, is occasioned by the presence of a fragment of cap in the injured eye, and that the only means of preventing such inflammation, or of allaying it when it has arisen, is the removal of the fragment. * * *

“ * * * The operator forms, by means of Beer’s knife, a large flap of the cornea. The knife may now be directed through the pupil and lens, so as to give an opportunity for the lens to come away, along with a part of the vitreous humor, and perhaps the fragment of cap. If there is no appearance of the foreign body in what is discharged from the eye, the flap of the cornea is to be seized with a pair of forceps, and cut away with curved scissors. A dose of laudanum is then given, and a linseed-meal poultice applied over the eyelids. * * * The eye is so exceedingly sensitive that attempts to search for the fragment of the cap cannot be endured. In all Mr. Barton’s cases, the cap was found in the poultice, or in the coagulum which closed the opening into the eye one or more days after the operation.”

Writing on sympathetic ophthalmitis (*Syn. Iritis sympathetica*) Maekenzie says (*Op. cit.*, p. 621):

“When there is a suspicion that some foreign body is lodged within the injured eye, there can be no question that Mr. Barton’s practice ought to be adopted; but even in other cases, why should we hesitate to lay open an eye in which vision is extinguished, if the operation affords a reasonable hope of our being thereby able to save the other?”

Barton’s operation, like Wardrop’s, must have resulted in the complete emptying of the scleral cavity through suppuration, with subsequent consolidation of the remains of the eyeball into a comparatively small nodule as in cases of total suppuration of the contents of the eyeball from other causes. The nearly perfect immunity from sympathetic complications after panophthalmitis is generally conceded, and there can be no reasonable doubt of the substantial justice of the claims made for Barton’s operation in this respect. Moreover as compared with the very radical operation of extirpation of the eyeball, as it was formerly practiced, there can be no doubt that it left the parts in an immensely more favorable condition for the reception of an artificial eye. The distinction, as regards curability, between sympathetic irritation and sympathetic inflammation was not yet clearly formulated.

The modern operation of enucleation, with preservation of the entire conjunctival membrane (O’Ferrall; Dublin, 1841.—Bonnet; *Annales D’Oculistique*, 1842), naturally superseded, for a time, these older operative procedures. The simplicity and apparent safety of the operation, the rapid recovery, the comparatively favorable condition of the parts for the wearing of an artificial eye, and above all the thoroughness of the removal of the diseased and offending organ, gained for the new method immediate and general approval. With the adoption of enucleation the arguments in favor of the preservation of a shrunken nodule of scleral tissue lost almost completely their former weight, although something of old prejudice lingered, and indeed still finds occasional expression in the assertion that prothesis is more successful when even a very small stump of the eyeball is preserved.

Among the objections which may fairly be urged against enucleation the most important is its occasional sequel of fatal meningitis. This danger was early recognized in the case of enu-

cleation during active inflammation of the eyeball and of Tenon's capsule, but it appears to be well established that the operation is in no case absolutely free from risk. Professor Graefe reports two fatal cases from meningitis in a personal experience of about six hundred enucleations, and this estimate of the danger to life incident to the operation cannot be considered excessive. What the percentage of fatal results after exenteration may be, remains to be proved, but it is not unreasonable to hope that it will be less than after enucleation. On the other hand the general adoption of antiseptic precautions may be expected to diminish the mortality after enucleation.

An insurmountable obstacle to the timely performance of enucleation is not infrequently encountered in the strong prejudice which often exists in the minds of patients and their friends against what they consider a grave mutilation. Such persons will sometimes accept a proposal to remove a part of an injured and disfigured blind eye, although they may refuse absolutely to submit, or to subject a child, to the more radical operation. Hence abscision, or abscision with exenteration, must occasionally be accepted as the only practicable resource, even in cases in which the preference of the surgeon might be for enucleation.

Abscision of the anterior portion of the eyeball, with closure of the opening by a horizontal line of sutures, as recommended by Critchett (*Ophthalmic Hospital Reports*, IV., p. 7, *sqq.*) yields, in a very large proportion of cases, an excellent movable stump, free from tenderness or irritability, and of the most suitable dimensions for the support of the lids or of an artificial eye. Unfortunately a few cases have occurred in which it has been followed by sympathetic irido-cyclitis, a result which has been attributed to irritation consequent upon the employment of deep sutures in the sclera and ciliary body or choroid. Accordingly the operation has been modified by the substitution of sutures in the conjunctiva for those in the sclera (Knapp, *Archiv f. Ophthalmologie*, XIV, I, S. 275), but unfortunately, with decided impairment of the immediate results, owing to the tendency of the conjunctival sutures to cut their way out before the scleral wound has become consolidated.

Professor H. W. Williams, of Boston, who has extensively practiced suture of the cornea after flap-extraction of cataract, recommends the use of similar very fine sutures in the sclera after abscision. He uses the finest sewing needles, cut to a length of ten or twelve millimetres and ground to a cutting point, and inserts the sutures close to the margin of the scleral wound. (*The Diagnosis and Treatment of the Diseases of the Eye*, Boston, 1881, p. 121). Inserted in this manner the scleral sutures are quite as effective as in the method of Critchett, and are probably also free from danger; they may be left *in situ* until the scleral wound has become well consolidated or until they come away spontaneously. As thus modified, abscision would seem to be altogether the best operation in most cases of disease confined to the anterior portion of the eyeball. In a case of a large and painful corneo-scleral staphyloma, following an ill-advised attempt to depress a soft cataract in a child, I have thus succeeded in preserving, for over twelve years, a stump of large dimensions, perfectly free from irritation and retaining excellent perception of light.

Abscision of the anterior portion of the eyeball with removal of the choroid and closure of the scleral wound by sutures, has also been practiced by Williams (*Trans. Am. Ophth. Soc'y*, 1878.) A patient had been etherized for the purpose of performing abscision for relief from staphyloma, with tenderness of the ciliary region, and as a preparation for wearing an artificial eye; a large bony shell was encountered, lining the posterior two-thirds of the globe, which was removed *in toto*, and the scleral wound closed by sutures. The exenterated scleral sack healed without material shrinkage, and remained free from irritability. The result is stated to have been in every way excellent.

Williams advocates abscision with suture in preference to enucleation, in anterior staphyloma, and, generally, in affections which are confined to the anterior portion of the eyeball (*Op. cit.*, p. 55.) In the case of deep suppuration following abscision, he advises to scoop out the sloughing contents of the globe, leaving only the sclera to form a stump for the support of an artificial eye (*Op. cit.*, p. 122.) In favor of exenteration Wil-

liams urges the same reasons which are now brought forward, namely, the "less risk of septicæmic infection," the value of the remnant of the sclera as a support for the eyelids or for an artificial eye, (*Op. cit.*, p. 121), and the protection against sympathetic inflammation of the other eye, (*Trans. Am. Ophth. Soc'y*, 1878).

In a verbal communication made at a meeting of the American Ophthalmological Society several years ago, Professor Henry D. Noyes, of New York, advocated the complete evisceration of the eyeball as a means of shortening the period of inflammation in panophthalmitis. Writing on panophthalmitis (*A Treatise on Diseases of the Eye*, New York, 1881, p. 189) he says: "For this deplorable state one of several proceedings may be selected; first, more extensive incision, dividing the ciliary region with intentional partial escape of vitreous; or, secondly, the wiping out of the contents of the sclera after making the incision (*evisceratio bulbi*); or, thirdly, enucleation of the eyeball.

* * * The choice of one of these methods is to be determined by circumstances. I have found the evisceration an admirable resort, because it yields a better stump for an artificial eye, and more quickly terminates the [suppurative] process than simple division. Enucleation is sometimes rather a severe operation, is troublesome to do because of hæmorrhage and orbital infiltration, and leaves a less favorable nidus for an artificial eye.

* * * A few cases of fatal issue after such an operation have been recorded.

* * * In hospital practice enucleation is done with more frequency than evisceration, because the subjects are more speedily enabled to resume their work. Yet the other [evisceration] is often practiced, especially for women."

Under the head of *staphyloma* Noyes (*Op. cit.*, p. 195) thus judiciously sums up the comparative merits of the three operative procedures now under discussion. Having mentioned the old operation of abscision of large staphylomata with removal of the lens, he writes:

"But sometimes serious intra-ocular hæmorrhage and grave inflammation of the interior of the eye follow this simple proceeding. In view of this not infrequent liability operations

have been devised for closing up the wound, which should also serve to prevent the loss of the vitreous. Mr. Critchett carries needles armed with sutures through the ciliary region, and leaves them in place until next he abscises the staphyloma, and if needful lets out the lens, then he draws through and knots the sutures. Dr. Knapp makes use of the conjunctiva with the same view, dissecting up a strip of it from the base of the staphyloma, and through this passes the proper number of threads, excises the staphyloma and draws the conjunctiva over the opening. * * * In Mr. Critchett's method the needles perforate the dangerous ciliary zone and may cause serious reaction, including the possibility of sympathetic trouble of the other eye. By Dr. Knapp's method, which is less objectionable, we do not, as I have found, obtain certain immunity from the deep inflammation. If the whole pre-equatorial part of the eye enlarge, the case will be very likely to cause trouble; especially will this be true in delicate persons. Therefore, with large staphylomata whose walls are thin, I advise against both Critchett's and Knapp's operations; I prefer either enucleation, which I might with great reluctance decide to do, or I would cut off the anterior part of the globe and wipe out its contents. * * * For young subjects every palliative proceeding is to be tried in preference to enucleation, especially in females."

Schweigger (*Hand-Book of Ophthalmology*; translated from the third German edition, Philadelphia, 1878, p. 316) objects to Critchett's operation on the score of danger from the deep sutures passed through the ciliary region, and to Knapp's modification of the same operation as ineffective; he advises, rather, to apply sutures of catgut in the sclera after the abscision of the staphyloma, operating under deep narcosis in order to prevent extrusion of the vitreous. Schweigger does not mention exenteration.

In cases of lodgment of a foreign body within the cavity of the eyeball, exenteration, with suture of the scleral wound, affords the most direct way of at once getting rid of the offending body, and removing such of the tissues of the eyeball as are especially prone to suppuration. Conrad Froehlich (*Klinische Monatsblätter f. Augenheilkunde*, XIX, 1880, S. 30.) reports a case

of abscision of the anterior portion of the eyeball, with complete removal of the contents of the scleral sack and closure of the wound by sutures in the conjunctiva. Healing was accomplished *per primam*, and on the sixth day the patient presented a very movable stump, which, as is stated, permitted better movement of the artificial eye which was subsequently worn than is attained after enucleation.

Of Professor Graefe's paper on *Exenteratio sive Evisceratio Bulbi* read before the *Versammlung Deutscher Naturforscher und Aertzte*, Magdeburg, September 1884, an abstract has appeared in this journal; also extracts from Professor Graefe's reply to a criticism by Professor Manz, of Freiburg. (*Am. Jour. of Ophthalmology*, II. pp. 1, *sqq.*, and 21, *sqq.*) The advantages claimed by Professor Graefe for exenteration as compared with enucleation are thus summed up in his original paper:

1) "There is no wounding of the ways of communication between the orbit and cranium, especially of the lymph sheath of the optic nerve, by means of which the inflammation following the operative lesion is propagated.

2) The stump which is obtained is much superior to that of the enucleated eye. The artificial eye has a greater extent of motion."

In his reply to Professor Manz (*Klinische Monatsblätter f. Augenheilkunde*, XXIII, S. 49, *sqq.*), Professor Graefe says further:

"I am satisfied that there is no difference in the operative technical difficulties of exenteratio bulbi and enucleation."

Also:

"The healing is often *per primam*; in other cases a considerable reaction (swelling of eyelids, chemosis, and secretion) occurs. In the former case the patients may be discharged on the third to the sixth day; in the latter case the convalescence is prolonged to about the end of the second week, but only on account of the chemosis which continues after all other symptoms of irritation have disappeared."

As cases in which exenteration offers especial advantages, as compared with enucleation or with merely expectant treatment,

he particularly mentions "recent hopeless injuries of the eyeball and beginning or established panophthalmitis."

Regarding the different operative procedures for the removal of a part of or the whole eyeball, the following conclusions may be considered as fairly justified by past and recent experience.

a) Simple abseision of anterior staphyloma (Beer) is applicable only to cases in which the enlargement is confined to the region of the cornea, in which, as a rule, the lens can be preserved *in situ*.

b) Abseision with closure of the scleral opening by sutures (*Critchett, et al.*), is always to be preferred to simple abseision, and is also applicable to cases of more extensive staphyloma in which some portion of the sclera, and also the lens, iris and a part or the whole of the ciliary body are removed. This procedure is applicable even to certain cases of malignant disease when confined strictly to the anterior portion of the eyeball (*Williams*).

c) Abseision, or free incision of the anterior portion of the eyeball with complete removal of the contents of the globe (exenteration), is an effective and useful means of shortening the period of active inflammation in cases of operation in which choroidal hæmorrhage has occurred as an accident, and in cases of incipient or established panophthalmitis (*Beer, Noyes, Williams*).

d) Exenteration with suture of the scleral opening (*Williams, Froehlich, Graefe*) is generally followed by closure of the wound, with preservation of the remnant of the scleral sack; thus affording a useful stump for the support of the eyelids or of an artificial eye, which more or less perfectly approaches in character to the excellent stumps obtained by abseision with suture.

e) Exenteration is, on the whole, as easy of performance as enucleation, and in some cases much easier.

f) Exenteration is presumably less likely than enucleation to lead to secondary fatal meningitis; and there is as yet no evidence that it is attended with any special risks of its own.

g) Exenteration would seem to offer as perfect safeguards against sympathetic inflammation of the other eye, and as com-

plete relief from sympathetic irritation, as does enucleation. An exception to this statement must be made in cases in which a foreign body is lodged behind the eyeball in or near the optic nerve.

h) Exenteration will occasionally be accepted by the patient or his friends in cases in which the proposal to enucleate would be rejected by them, and it may then be the best available resort.

i) Abscision with improved methods of suture, and exenteration with suture of the scleral opening, have already had a somewhat extended trial, and thus far with altogether encouraging results; and it is now entirely admissible to adopt one or the other of these procedures in a considerable proportion of the cases in which enucleation has of late years been generally recommended to the exclusion of less radical methods.

CLINICAL CONTRIBUTIONS TO THE STUDY OF RETRO-BULBAR AFFECTIONS OF THE OPTIC NERVE.

BY SWAN M. BURNETT, M. D., WASHINGTON, D. C.

Affections of the optic nerve posterior to the globe unconnected with grave central lesions, and leading to atrophy more or less complete of the disk, are not so common as to render reports of such cases, even when not accompanied by the post-mortem appearances, without interest.

The following histories are offered as contributions to the clinical study of such conditions.

All of the three cases represent, I believe, the effect of pressure on the nerve, which, however, in but one instance, was accompanied by evidence of papillitis.

CASE I.—*Blindness of Left Eye Rapidly Becoming Total; Followed by Atrophy of the Disk; Return of Vision in the Upper and Lower Inner Field; Paralysis of the First, Third, and Seventh Nerves of the Left Side; Partial Recovery under Anti-Syphilitic Treatment and Electricity.*

Margaret Burgoyne, colored, aged 33, was sent to my service at the Central Dispensary by the late Surgeon-General Barnes on March 30, 1880. She reported that four weeks before she had received a blow on the left temple, which, however, was followed by no immediate consequences. One week later there was pain in the left side of the head which was periodical in character, and a feeling of soreness in the bottom of the left orbit. Vision gradually faded away until ten days ago when there remained no longer even perception of light. The position and movements of the eye were normal, the pupil con-

tracted consensually and not by direct light. Vision and visual field in the other eye normal. An ophthalmoscopic examination showed the fundus to be normal. The color of the disk was good and the size and course of the vessels were not different in any important particular from the other eye. No clear history of syphilis could be made out.

On May 11, when she presented herself again after a long absence from the clinic there was a complete paralysis of the seventh pair in the left side. The eye was closed with difficulty from implication of the orbicularis and the tongue was drawn to the right. This condition had come on suddenly on April 30 after a fainting fit. Vision however had returned to some extent in the upper field, she being able to count fingers at two feet. Ophthalmoscopic appearances unchanged. Wishing to give her the benefit of the doubt, an antisiphilitic treatment was ordered. The condition remained unaltered except that V gradually improved in the upper field until June 22, when fingers could be counted at ten feet. At this time she complained of a loss of the sense of smell. During all this time there were no other symptoms referable to the brain except a headache, which came on for a time periodically at 5 P. M. every day.

On July 2, when I made an ophthalmoscopic examination I thought there was a commencing decoloration of the inner side of the disk, the vessels remaining normal. V. F. as before; the paralysis of the seventh pair under the use of electricity improving.

On October 3, after severe pain in the left side of the head there was a paralysis of the third pair in all its branches. The blanching of the inner side of the disk had steadily advanced until it was now very pronounced; vessels normal.

On January 4, 1881, the paralysis of the third pair had improved and she was able to open the eye slightly. Its V. F. was clearing at the lower inner quadrant, where she can count fingers at five feet. The whole surface of the disk much whiter than on the right side. When seen for the last time on April 29 she could count fingers at ten feet, except in the lower outer quadrant of the V. F., where there was barely perception of light. The disk had not altered materially in appearance from that of

last report. The muscular paresis both of the seventh and third pairs was much better. There was some drooping of the lid, some convergent strabismus, and some distortion of the face. The patient then passed out of sight and I have been unable to follow her history further, though it is a fair presumption that there has been no material change in her condition.

In this case it is apparent that the pressure exerted on the nerve was not intra-orbital. Any inflammation or new growth which could exert sufficient pressure to lead to atrophy of the nerve would give rise to an exophthalmus which was notably absent in the clinical history. The morbid process must, therefore, have affected the nerve either within the optic foramen or between that and the chiasma. That the chiasma itself was unaffected is evidenced by the unimpaired function of the other eye. The soreness at the bottom of the orbit complained of would lead to the supposition of a periostitis of the foramen but this could not alone have made sufficient pressure to lead to atrophy without interfering with the circulation through the ophthalmic artery, and no evidence of this was present.

It seems most probable, therefore, that the pathological process was posterior to the foramen and that it was sufficiently extensive to implicate in time the first and third pairs on that side, which lie in proximity to the second at that point. The most reasonable hypothesis, in view of the recovery under specific treatment, is, that the pathological product was a gumma. The affection of the seventh pair must have been independent and was most likely due to pressure somewhere along its course through the temporal bone. Any important complication on the part of the brain itself can be, I think, excluded.

The important feature of the case from a practical standpoint is the partial return to activity of a large portion of the optic nerve fibres after prolonged compression. Its interest pathologically attaches to the gradual progress of the atrophic changes along the nerve from the seat of injury to its terminus in the optic disk. This latter phenomenon, however, is so common that we can look upon it as almost a characteristic sign of nerve atrophy. The molecular changes attending the

atrophic condition when once set up in any part of a fibre usually extend themselves in time along its whole course.

CASE II.—*Inflammation, Probably Rheumatic, Within the Orbit - Abscess—Signs of Optic Neuritis; followed by Atrophy. Vision Nil.*

Richard Dante, white, aged 34, was sent to my service at the Central Dispensary on November 24, 1882, by Dr. A. P. Rogers, of Washington, with the following history:

He was of a rheumatic tendency and had had attacks at various times of severe rheumatic inflammation of the legs and feet. He had for some time been complaining of a pain (soreness?) in the right orbit. On October 21, 1882, he rode into the country facing a strong wind, and on the 25th signs of active inflammation were manifest in the right eye. The lids were red and swollen to such an extent as to close them. The ball was red and chemotic and protruded so that the cornea was even with the bridge of the nose. There was a flow of tears and great pain. At the end of three or four days something "broke" behind the eye and matter began to run and continued for four days. After this the swelling began to subside.

When I saw him four weeks after the trouble began there was the remains of a chemosis at the lower portion of the ball, in the form of a roll of thickened conjunctiva, but there was no exophthalmus; the movements of the eye were good. The pupil did not dilate on the direct action of light, but did so consensually. V was nil. The O. D. was indistinct in its outline, the arteries seemed small, and the veins large and tortuous. Otherwise the fundus appeared normal. The only fact that could be elicited pointing to syphilis was an eruption on the skin seven or eight years ago, supposed to be barber's itch, which finally got on to the scalp and caused the hair to fall out. He continued under observation for some time and specific treatment was tried faithfully, but with no avail. He was examined again on June, 1884, and his V was still nil. The edges of the disk were ragged, and its surface white, but the size and distribution of the retinal vessels did not depart in any essential particular from that of the other eye.

The features in this case are those which are usually pre-

sented in abscess or extensive inflammation within the orbit, and are all referable to pressure on the optic nerve and ophthalmic vessels. The active changes on the disk may have been due in part to an inflammation proper on the part of the nerve, but it seems most probable that the total atrophy was due not so much to inflammatory changes in its substance as to the pressure it sustained from the intra-orbital inflammation; particularly if there was much swelling about the optic foramen.

CASE III.—*Exophthalmus and Paralysis of all the Muscles of the Right Eye; Absolute Blindness. Disappearance of Exophthalmus and Paralysis under Antisymphilitic Treatment; Return of Some Vision; White Atrophy of the Disk. Antecedent White Atrophy with Loss of Vision in Left with Ophthalmoplegia Completa.*

Logan Gray, colored, aged 60, was admitted to my service at the Central Dispensary on June 2, 1882. He had syphilis ten or twelve years ago and three years ago he was affected with severe headaches and loss of V in left eye. Six months later he had left hemiplegia. In this eye there is complete paralysis of all the external muscles; pupil inactive; simply p. l. O. D. white, but with clearly defined edges; vessels very narrow in calibre and scant in number. On the right side there is a marked but not excessive exophthalmus, and complete immobility of the eye but no swelling of the lids and lagophthalmus; pupil dilated but not *ad maximum*; no p. l.

O. S. showed no important changes in the fundus; the disk and vessels appearing normal. There was not a great amount of pain, but some soreness in the orbit which was more pronounced on pressure. The vision in the right eye was said to have been good up to ten days ago, when the protrusion and the accompanying blindness suddenly set in. He was put on an active antisymphilitic treatment. On June 9, his condition was unchanged, and he was seen no more until July 7, when the exophthalmus had entirely disappeared and the eyeball was moveable freely in all directions and the lids could be easily closed. Fingers were counted at two feet and there was no defect in the V. F. O. S. appearances unchanged. On July 18, fingers could be counted at one meter. There was then some blanch-

ing of the disk, but no important alterations in the vessels. The blanching gradually increased up to September 12, 1882, at which time fingers could be counted at two metres. He then passed from observation. I examined him again, however, on June 1, 1884, and found his V = fingers at four meters and V. F. normal for white and no important change for colors. The disk was perfectly white, with no small vessels on its surface, and the arterics were much reduced in size.

The symptoms and appearances in this case point to a periorbitis at the apex of the orbit leading to pressure upon the optic as well as the nerves supplying the muscles of the globe. That the pressure on the optic nerve was posterior to the entrance of the central vessels of the retina is evident from the lack of signs of interference with the retinal circulation. So far as the character of the optic nerve atrophy is concerned this case is similar to Case I.

CELLOIDIN; THE NEW MATERIAL FOR EMBEDDING
SPECIMENS FOR MICROSCOPIC SECTION CUT-
TING; ITS METHOD OF USE AND ITS
ADVANTAGES.¹

BY MYLES STANDISH, M. D., BOSTON, MASS.

The microscopic examination of the eye has always been hedged about by the extreme difficulty of the technique. Especially has this been the case when the examination of sections which cut through the entire eye or any considerable portion was necessary for the elucidation of the point to be examined. To cut through tissues varying in density from that of the sclera to that of the vitreous body has been the problem. To accomplish this some method of embedding is necessary, all of the methods heretofore in use employed the agency of heat to accomplish this, and thus became necessary water-baths, melting apparatus and a very considerable paraphernalia. In addition the tissue to be permeated all through equally should be kept in a molten solution of the embedding fluid for from twenty-four to thirty-six hours before it is embedded; this, of course, necessitated the maintenance of heat just enough to keep the mass molten for all this time; if the heat became too great the spec-

1. My attention was first called to celloidin by a brief reference to a paper written on the subject by W. Jennings Milles in the *British Medical Journal* over a year ago, and after I had written to that gentleman on the subject he kindly replied in full as to his manner of using it. For many of the details of the method herein described I am indebted to Dr. C. S. Minot of the Harvard Histological Laboratory, where my work with this material has been done.

imen was destroyed, if not enough the process had to be recommenced.

All of these things cooperated to prevent microscopic examination of the eye being made, except at some large histological laboratory where all these conditions could be met. The expense of the apparatus and the large amount of room occupied by it effectually prevented the physician from attempting it either at home or in his office.

By the celloidin method of embedding all these objections are avoided. The only pieces of apparatus required are a few large bottles, corks and a few lead weights which any one can extemporize in a few hours. There is no temperature to be continually watched, there is no point in the whole process at which it cannot be immediately and safely discontinued and left with absolute security for weeks or months if necessary.

The whole process is done in closed bottles, so the danger of dust and overturning are reduced to a minimum; it produces no dirt and can be easily used in an office and put up on the closet shelves out of the way when not in actual process of manipulation.

But the great and crowning advantage of celloidin for use in embedding eyes lies in the fact that it is transparent, and so it is not necessary to dissolve out the embedding material in order to stain and mount the section.

The immense advantage of this can be readily seen, as the different tissues of the eye cut in some directions have no connection, so that when the embedding material is dissolved the section immediately falls apart and we can no longer distinguish the relationship of the various parts. The tissues can be stained without coloring the surrounding celloidin at all, and when the specimen is mounted the presence of the embedding material would never be surmised.

The celloidin used by me was manufactured by E. Schering, of Berlin, and comes in the form of cakes about four inches long, two and one half broad, and one-fourth of an inch thick; it is very hard, semi-transparent and resembles in appearance a piece of glue. It can also be bought cut up into fine shavings. To prepare this material

for use it is first necessary to cut or break a sufficient quantity into small pieces and then dissolve it in equal parts of ordinary strong alcohol (95 per cent) and sulphuric ether. It will take forty-eight hours to dissolve and then the solution should be about as thick as a heavy syrup. The proportion is about 14 grammes of celloidin to 100 cubic centimetres of the solvent.

A thin solution of the celloidin should be prepared by taking a portion of the above solution and by adding an equal part of the alcohol and ether mixture.

Method of Embedding.—Immediately upon the removal of the eye it should be placed in Mueller's fluid. The cornea and sclera should first be perforated to allow the access of the preserving fluid to all parts. When the eye has been sufficiently hardened a good method of removing the chromic acid is by simply putting the eye into a four per cent. aqueous solution of chloral hydrate and changing the fluid three or four times in several days. The advantage of this method for office work over that of washing under continuous stream will be obvious.

Next, if the vitreous is to be taken into consideration in the examination about to be made, it is best to freeze the eye and cut it through in an anterior-posterior direction. The specimen being prepared it is first placed in a mixture of equal parts of strong alcohol and ether to remove all traces of water. In this it is allowed to remain for twenty-four hours. In order to permeate the object thoroughly with the celloidin it is next placed into the second or thin solution above described. Here it is allowed to remain for thirty-six hours.

The box for embedding is most conveniently constructed in the following manner. Procure a *cylindrical* cork and wrap about it a piece of stout unruled writing paper in such a manner that it shall project beyond the end of the cork and so form the box. When the paper has been wound twice around the cork the end is secured by a pin thrust directly into the cork. To the lower end of the cork is then attached a leaden weight. The handiest method of accomplishing this is perhaps to insert the head of a pin into a bullet; the pin can then be thrust directly into the bottom of the cork and the weight is then firmly enough attached for all purposes.

The specimen is now placed into the box and the celloidin solution poured into it so as to fill it to two or three times the height of the specimen, and after waiting a few minutes for a film to form on the surface of the celloidin the entire box is submerged in alcohol of a specific gravity of .82.

When this is done often many bubbles of air are forced out of the cork and rise up through the celloidin; some of these are apt to become entangled in the specimen and become a source of annoyance subsequently. In order to avoid this it is a good plan to have the cork in the alcohol and weighted for some hours before the box is made. Another plan, although not so effective, is to cover the upper surface of the cork with a thin coating of celloidin and so to glaze it over before the box is made. At the end of twenty-four hours the paper should be removed and the cork with the embedding mass attached should be returned to the alcohol and allowed to remain until a suitable degree of density has been obtained for section cutting. If this process seems too slow it can be hastened by employing a lower per cent. alcohol, of say 60 to 75 per cent.

When sufficiently hardened the cork can be put in the holder of the microtome. In cutting the section a stream of alcohol should irrigate the knife. The sections are best removed from the knife by the aid of a camel's hair pencil. These sections will be entirely transparent even if the celloidin in the mass appears somewhat opaque.

The sections as fast as cut should be put into 90 per cent. alcohol. The surplus celloidin cut away from about the specimen can be returned to the strong solution and be used again.

A great advantage lies in the fact that the embedded specimen or the sections can be preserved without injury for months if kept in alcohol.

The sections can be mounted entire (embedding material and all.) The staining fluids do not color the celloidin. It does not do to attempt to clear up the specimen in the ordinary way with the oil of cloves as the celloidin contracts and spoils the specimen. The clearing up can be accomplished by following the ordinary methods and by using oil of bergamot instead of

the oil of cloves. The odor of the oil of bergamot would prevent this method in an office however.

A very good and rapid method of clearing up the specimen is as follows: Place the section after staining on the slide it is mounted on, and wash quickly but thoroughly with a few drops of *absolute* alcohol, drain it off and quickly add a few drops of chloroform, enough to entirely cover the section and add thereto drop by drop until the section is entirely clear; then just as the last of the chloroform evaporates from the section drop on the balsam. Another method which is exceedingly advantageous where a large number of sections of a specimen are to be mounted, is as follows: The stained section is placed on a slide and then a few drops of a thin solution of bleached shellac are dropped onto it. The slide is then put into an oven or other warm place free from dust and left until the shellac covering is perfectly hard; it is then treated with oil of cloves and covered.

If the specimen is of such a nature that it will not fall apart upon dissolving the celloidin the sections can be put into a mixture of alcohol and ether of equal parts for twenty-four hours and if sufficient solvent has been used the sections will be entirely freed from the celloidin. If it is for any reason desirable to free the section from the celloidin and at the same time it is from its nature liable to become disintegrated, the best method is to place the section upon a piece of rice paper and then add the ether and alcohol solvent after which the specimen can be easily transferred to the slide.

REPORT OF THE OPHTHALMOLOGICAL SECTION
OF THE AMERICAN MEDICAL ASSOCIATION
HELD AT NEW ORLEANS, APRIL, 1885.

BY DR. R. TILLEY, CHICAGO, ILL.

The chair was occupied by Dr. A. J. White, of Richmond, Virginia.

Dr. Flavel B. Tiffany, of Kansas City, Mo., read a paper on "Sympathetic Ophthalmia with Calcareous and Ossific Deposits," illustrated by specimens of enucleated eyes, in one of which he exhibited an ossification embracing nearly the whole of the choroid, the bone extending even to the ora serrata, having a small opening opposite the optic nerve through which passed the retina, which was completely detached by the bone. The lens of this eye was calcified "in situ" and the cornea partially calcified and hypertrophied. In another case was shown an ossification of the sclerotic, the only one on record that he knows of.

Dr. Tilley does not think it possible to have ossific metamorphosis in any tissue that has no blood-vessels, hence he cannot understand how Dr. Voorhies can account for ossifications of the lens.

In the eye with ossification of the sclera there was a worm $\frac{1}{4}$ of an inch long imbedded in the choroid even to the sclera.

Dr. Tiffany supports the theory that sympathetic ophthalmia is a reflected disease and takes its transit through the medium of the ciliary nerves, and he gives the following data:

- a. Sympathetic ophthalmia is a plastic inflammation, a form of inflammation peculiar to vascular and not to nerve-tissue.
- b. It is an inflammation of the uveal tract, usually of the

ciliary body, frequently involving the iris and choroid while the retina remains intact.

c. In inflammation of nerve-tissues it is the neurilemma or medullary portion rather than the axial part that is involved.

d. The optic nerve-sheath does not enter the eye, but passes over on to the sclera, leaving the nerve to enter the eye as a non-medullary nerve.

e. The ciliary nerves enter the eye and do not leave their medullary portion until they are lodged in the ciliary body (region).

f. The ciliary nerves go to supply, and are intimately connected with the uveal tract and ciliary region, whereas the optic nerve has no immediate connection with this tract.

g. Were the optic nerve the medium of transmission to propagation of the inflammation by extension, enucleation would not be likely to arrest the inflammation.

h. Sympathetic ophthalmia, occurs in eyes, with completely atrophied and even cretaceous degeneration of the optic nerve.

i. The sympathetic irritation has been arrested by division of the ciliary nerves, near their entrance into the sclera, leaving the optic nerve intact.

In one case sympathetic ophthalmia was arrested by resecting the stump of an eye enucleated some three years previously, in which filaments of the sympathetic nerves were thought to be entangled.

Dr. Herbert Harlan, of Baltimore, reported a case of hereditary glaucoma which in one family had appeared in five successive generations before the age of twenty. The patient, a girl of 17 years of age, was affected in both eyes. $V = \frac{2^0}{c}$ in each eye. T+1, cupped discs. The mother was seen and examined. The family gave the history of the other three generations. Numerous cousins, uncles and aunts were also blind from some cause.

Double iridectomy was performed with good results.

In discussing the above case Dr. Eugene Smith, of Detroit, the Secretary, claimed that glaucoma often existed even in the absence of increased tension.

Dr. R. Tilley deemed great caution necessary in classifying cases of glaucoma as hereditary, suggesting that a distinction should be made between the heredity of glaucoma and the heredity of certain anatomical peculiarities predisposing to glaucoma.

Dr. Tilley could not agree with the Secretary that glaucoma ever existed without an increase of tension. According to his notion, increase of tension was absolutely necessary to the varied phenomena constituting glaucoma.

Dr. Scott, of Cleveland, was surprised that any one of any experience should consider increase of tension a necessary condition of glaucoma.

The President, Dr. White, had been so accustomed to diagnose glaucoma in the absence of increased tension that he thought it recognized by all ophthalmologists that an increase of tension was not a necessary constituent of the various symptoms of glaucoma.

Dr. Pope, of New Orleans, held that increase of tension was at any rate a fundamental factor in every case of glaucoma. That the cupping of the optic nerve as well as the advance of the iris was the result merely of mechanical pressure produced by an increase of tension.

Several members bore testimony to the influence of heredity in glaucoma.

Dr. T. E. Murrell read a paper on

“DETERMINING ERRORS OF REFRACTION BY DOUBLE IMAGES
AND BY PARALLAX.”

By Double Images:—Two small pencils of light from a distant point of light on passing through the pupil near opposite margins will meet in one point in the retina in E. but in separate points in M. and H. Hence if a single point is seen there is E., if two points H. or M., or As. The latter can be determined by trying different meridians, effected by two perforations in a disc 1 m dia., and 1 m apart, which fits in trial frames. Sensitive to $\frac{1}{2}$ D. Correcting glass gives one point of light.

By Parallax:—If a single small perforation 1 m or less in dia. in a disc is moved in straight lines back and forth across the pupil while vision is fixed on a distant object, it will appear

motionless in E.; to move with the disc in M; and in opposite direction in H. In As. the disc should be moved in a line with the faulty meridian to determine the kind and degree of As. Sensitive to $\frac{1}{4}$ D. Correcting glass gives steadiness of object in all meridians.

Dr. Fulton referred briefly to the literature of the subject and to the fact that it is to be found more in the journals of general medicine than in those of ophthalmology. He said that it is generally admitted by ophthalmologists, and by the general profession as well, that there is an intimate relationship existing between the eye strain of uncorrected errors of refraction and certain forms of headache. But this had impressed itself so strongly upon the medical mind, that but few physicians of the present day ever treated a case mechanically without having first settled the question as to whether some kind of optical defect may not be the underlying cause. It was indicated in the paper that certain forms of refractive errors produced certain forms of headache. But in the experience of the writer hypermetropic astigmatism is more apt to produce occipital headache and that the myopic astigmatism is more apt to bring on the frontal.

The clinical history of a few cases was given illustrating this subject. Some of the cases of frontal or occipital headache, when complicated by frequent attacks of migraine which in some cases was removed and in others mitigated by the correcting glass. But the author thought that the cases of such headaches to be cured by glasses were very few.

As to the nature of the pain it was said that with some cases it was constant but with most cases it came on after prolonged use of the eyes. Some cases suffered with moderate pain all the time, which would always be increased by new work. That a constantly changing field of vision was apt to bring it on.

It was pointed out that all cases of headache associated with an error of refraction could not be cured by the correcting glass; the two points may be a mere coincidence; but if the pain and all symptoms of irritation disappear under the prolonged influence of atropia it is quite certain that the optical defect is the cause of the trouble. By the removal of the eye-strain many

other troubles are frequently reduced which are the result of the reflex induration.

Through the agency of the pneumogastric nerve, palpitation of the heart and various gastric disturbances are also the result of neglected eye-strain.

These very annoying symptoms can frequently be removed and the general health greatly improved by the use of the proper glasses.

During the discussion of the preceding paper our reporter was not present.

TRANSLATION.

The following methods and rules for cystotomy are given by Dr. J. M. Prouff in an article in the *Revue Clinique d'Oculistique*:

1. SIMPLE CAPSULOTOMY.

The capsulotomy with the cystotome is done in the following manner:

First step: Enter the small triangular needle of Desmarres at the upper end of the vertical meridian of the cornea in such a way as to obtain an inner wound about two mllms. in size.

Second step: Enter through this small wound the cystotome into the anterior chamber, as soon as the latter is reestablished, if it had been emptied, and let the cystotome lying on the flat glide down between the cornea and the capsule until it reaches the lower margin of the pupil.

Then rotating the instrument about 90 degrees insert the cystotome in the capsule which you want to cut and draw the instrument towards you until it reaches the level of the corneal incision.

If the cystotome cuts well you will get a vertical incision in the capsule. If the lips of the incision separate sufficiently, the operation is finished. Should these lips not separate sufficiently you must try to enlarge the new pupil by more or less numerous further incisions of the capsule. For this purpose direct the cystotome in the directions which appear to you the most preferable in the case.

2. CROSSED CAPSULOTOMY.

This method is used only when the simple capsulotomy has not been successful in establishing a satisfactory pupil. This fact will be at once evident to the operator, since the wound lips will approach each other in the future. Therefore, in order to have a pupil, which is to be definitely large enough, it must at first be more than sufficiently large. The operator must, therefore, be guided by his experience before he resorts to the crossed capsulotomy which is at once added to the simple capsulotomy.

Operative procedure. Wait until the anterior chamber is refilled by vitreous or aqueous humor. This will only take a few minutes.

First step: Enter the small triangular needle of Desmarres at or near the external end of the horizontal meridian and about one mllm. inside of the periphery of the cornea, so as to get an inner wound about two mllms. in size.

Second step: Through this little wound enter a blunt hook and let it glide on the flat between cornea and capsule until it has reached the inner margin of the pupil. Then make a rotation of 90° so as to turn the blunt point of the hook towards the capsule; then withdraw the hook, keeping it all the while in the same position.

It is clear that the blunt point of the hook must during this withdrawal fall into the vertical incision made previously into the capsule.

Thus the outer lip of the capsular wound will get caught by the blunt hook and the traction during the withdrawal of the hook will separate the lips of the capsular wound widely and a large pupil will be obtained. * * *

* * * The immense advantage of the simple and the crossed capsulotomy is, that all traction on the ciliary body is lessened.

Moreover, only the most superficial parts of the vitreous body are touched by the cystotome or by the blunt hook, and the small corneal wounds made by a cutting instrument, which causes no contusion, heal immediately. * * *

* * * These advantages are, according to our opinion, sufficient to convert most operators to our or a similar method of operating, * * *

* * * I furthermore hope that the needles of Bowman will gradually be abandoned for a procedure which is at the same time simpler, surer and more easily executed. * * *

J. Hirschberg and A. Birnbacher contribute a very interesting case of hæmorrhagic distention of the dura mater sheath of the optic nerve in the *Centralblatt f. Augenheilkunde*:

* * * F. Z., about 60 years old, has been well up to the spring of 1883. In March, 1883, had an apoplectic fit, in April a second one. Since then his speech is interfered with. Since August considerable weakness of intellect, and especially loss of memory were noticed.

October 1, 1883. Emaciated. Slight paresis of right facial nerve. Exophthalmus. Enormous arterio-sclerosis. Arteria radialis tortuous, pulse visible. Aneurism of right carotis externa of the size of a cherry-pit. First sound of the heart interrupted, second pure. No paralysis of extremities, but can walk only with difficulty and by the use of a cane. Much albumen in the urine, no formed elements. Dementia of a high degree. Functional examination of visual organs almost impossible.

R. E. The ophthalmoscope detects striated hæmorrhages near the papilla; some smaller ones in the centre of the retina; their number is, however, small. No old spots.

L. E. Close to the papilla a white spot; some minute changes caused by myopia.

Eleven days later, October 11, 1883. Death by apoplexy.

The post-mortem examination revealed in the brain fresh, large, intra-ventricular hæmorrhages on both sides and older ones in the process of softening in the left ganglia. There was general atherosclerosis of the arteries, enlargement of the heart with changes in the myocardium, and pronounced interstitial nephritis.

Anatomical examination of the eyes. Both optic nerves have

a spindle-shaped swelling, which commences close to the sclerotic and reaches backwards to a distance of eleven mllms., its largest diameter being six mllms., whilst the diameter of the optic nerve at its entrance into the sclerotic and behind the swelling is four mllms. In a sagital section of the nerve this swelling is seen to be caused by an enlargement of the dura mater sheath, through which the optic nerve runs backwards as a perfectly cylindrical bundle. The space between the dura mater and pia mater sheaths in this swelling is filled with a soft, yellowish-brown substance.

The microscopical examination of transverse sections taken from the optic nerve behind the swelling shows that its sheaths and the trabecules which enter the nerve from the pia mater sheath are perfectly normal. The glia, however, is reduced in quantity and replaced by a fluid exudation, which lies around the fibrillæ in such a manner that it separates their transverse sections from each other in the specimens. The fibrillæ do not show any degeneration and their sheaths are stained in the characteristic manner by Weigert's method. In some places this fluid exudation separates the fibres so widely as to cause interstices of the size of five or six transverse sections of these fibres. The glia nuclei are neither increased nor diminished in number.

In transverse sections of the swollen part the dura mater sheath appears widened, but otherwise unchanged; the lining endothelium is well preserved. The space between the pia mater and dura mater sheaths, which in sections taken from the middle part of the swelling is one mllm. in breadth, is filled with a wide-meshed network of considerably swollen arachnoidal trabecules, part of which have lost their fibrillar structure and look wax-like. The endothelial cells attached to these trabecules are mostly well preserved. The meshes of this network are filled with a finely granulated, untinted substance which contains a large quantity of round cells, nuclei and red blood-cells. The pia mater sheath and the optic nerve show the same conditions found in the sections from behind the swelling. The central blood-vessels are intact.

The most peripheral part of the optic nerve (three mllms. in

length) was cut longitudinally together with the posterior part of the eyeball. In such sections the substance filling the inter-vaginal space is seen gradually to diminish in quantity, but it reaches up to the sclerotic and the œdema of the optic nerve reaches through the lamina cribrosa into the retina surrounding the optic papilla. * * *

In an article "Experiences in Regard to the Therapeutic Value and the Manner of Administering Cocaine in Ophthalmology," by Dr. Bol. Wicherkiewicz in the *Centralblatt f. Praktische Augenheilkunde* the author states:

"* * * I also use cocaine in cases of trachoma where I desire to perform a painless operation of squeezing or scraping out trachoma granules. In paretic or paralytic muscles of the eye cocaine proved to be an admirable remedy, as it enabled me to apply the electrode immediately to the effected muscle without causing any pain to the patient.

In applying faradization in this direct method I observed a more rapid amelioration than in similar cases where the electric current had been applied according to the old method viz., through the closed eyelids.

Similar to this method Dor used the remedy for healing spontaneous mydriasis. In regard to the removal of foreign bodies or other small operations, I fully agree with Hirschberg that a skilled operator may get along without the remedy, but that it will prove of incalculable value to the less skillful colleague. In dispensary practice, where the number of patients is very large, the administration of cocaine consumes too much valuable time, therefore I use the remedy only in cases when the foreign body has penetrated deeply into the substance of the cornea, or when the patient reveals an extraordinary irritability while opening the eyes.

Cocaine, administered to patients suffering either from secondary or idiopathic blepharospasm shows excellent results. A patient, who had been suffering for four weeks with very annoying blepharospasm was benefitted after a single instillation of a 5 per cent solution and permanently relieved after several more applications. A short while ago, I treated a lady who had suffered for one year from photophobia due to hyperæsthesia retinæ,

photopsia, etc. She had been in the habit of remaining in a dark room and protecting her eyes with smoked-glass spectacles and an eye-shade. Nothing could convince her of the absurdity of such protective measures. After I had instilled several drops of cocaine into the eyes, patient opened them and consented to do away with her spectacles and eye-shade and was able to use her eyes in a moderate light.

Numerous times have I had occasion to observe cases in which blepharospasm through some slight cause exists producing a flow of tears and irritability of the retina from pressure and this irritability again causes blepharospasm where cocaine acts like a charm in breaking up this *circulus vitiosus*.

A valuable peculiarity of cocaine, which assists us in therapeutic purposes and examinations of the eye, is its mydriatic effect.

This effect was observed in a most varied manner in numerous cases. In some, the pupil was dilated after the lapse of ten minutes, in others, after several instillations, mydriasis set in after half an hour, or even an hour, and in still others, where the pupil seemed to be morbidly contracted, repeated application showed no effect.

Cocaine evidently did not act powerful enough in the above cases to overcome a spasmodic contraction of the sphincter pupillæ, which is decidedly the case with atropia as it acts by paralyzing the sphincter. After the pupil has been dilated, cocaine will take effect.

In regard to the paralysis of accommodation I made the following observation:

Irrespective of frequent instillation a paralysis was absent in some cases, in others it corresponded to 0.75 to 1.0 D. It is therefore not to be wondered at that with such different results there are different opinions in regard to the action upon the accommodation. As I am now treading upon disputed grounds, permit me to call the attention to another point of direct controversy. I refer to the reaction of cocaine in connection with the cauterly and astringents, especially nitrate of silver and cuprum.

Panas maintains, that cocaine has no anæsthetic effect upon a diseased eye. He says:

“L'oeil pathologique, on peut mieux dire, l'oeil enflammé, se montre plus ou moins réfractaire à l'action anesthésiante de la cocaine. Likewise Dr. Blanc & A. Chevallereau (*La France Médicale*, 20 Novembre, 1884).

E. Meyer, (*Revue général d'ophthalmologie*, 31 Octobre, 1884), is of the opposite opinion. He has convinced himself that cocaine produces anæsthesia of the inflamed conjunctiva and cornea just as it would act upon the healthy tissues, and that the cauterization of such conjunctiva produced no pain, as long as the instillation of cocaine was continued. As soon as the anæsthetic action of cocaine ceased pains would recur.

In the face of such opposing assertions we must observe the following two points: Whether cocaine produces entire anæsthesia of the inflamed membranes or only reduces its sensibility? and further, whether cocaine applied previously to caustics and astringents does away with pain?

In regard to the first question, I may answer in the affirmative. In some cases of painful acute inflammations of the conjunctiva, nay in iritis sive iridocyclitis, also in various forms of inflammations of the cornea, cocaine, applied either directly or hypodermically (0.01—1.02) produced a diminution of pain lasting about 15—20 minutes.

It is evident that cocaine is very effectual in affections of a trophic nature. Thus I observed an elderly lady who had been operated on by me for cataract some years ago with herpes corneæ on the operated eye to be relieved from most intense pain upon an application of a 5 per cent coc. hydrobrom. salve and compress bandage. The bandage was removed after 24 hours, when the shed off epithelium was regenerated, the cornea had cleared up and patient was free from pain. This affection recurred several times and was treated successfully in the same manner. As to the final result I can say nothing, as patient still remains under treatment.

Dr. Alt relates a case of a very dangerous inflammation of the iris, where all other remedies failed to give relief until cocaine was instilled with the very best results.

In regard to the second question, viz., the influence of cocaine upon the cauterized conjunctiva, I would like to state the following:

In cases where I applied a weak solution of cocaine previous to cuprum and this latter in a very gentle manner, patient generally experienced pain more acutely after one-quarter of an hour, than he would if the latter had been applied gently without previous cocaine. However, if a 5 per cent or 10 per cent solution of cocaine was instilled every five minutes, and the copper applied, patient would be free from pain after 15—20 minutes provided he would bathe his eyes in cold water. If the latter precaution is not observed pain will follow.

The reason for this is, that a weak solution of cocaine does not contract the blood vessels sufficiently. After a short while the contraction is replaced by a relaxation of the vessels with hyperæmia; as the caustic has been more or less dissolved in the tears, which are in the conjunctival sac, the patient feels the effects of it.

It is true in using a strong solution of cocaine pain disappears immediately, but as anesthesia diminishes the flow of tears, a strong concentrated caustic solution remains in the conjunctival sac and exerts a more powerful and lasting effect, which shows itself directly after the anesthetic subsides. The pathological secretion of the conjunctiva is lastingly diminished. A patient suffering from obstinate follicular conjunctivitis on whom I had been using cuprum with previous instillation of cocaine told me the following day that she had experienced greater pain than usual but that she was able to open her eyes without any difficulty in the morning. In fact I found the conjunctiva less swollen, the secretion ceased and follicles diminished.

Of late I have had occasion to use the new anesthetic in making iridotomies, and the patients thus operated upon did not perceive the least pain. No hæmorrhage from the iris took place, the artificial pupil became considerably larger after the pupillary membrane was cut, which was surely caused by the action of the cocaine on the radiary muscular fibres of the iris, which draw this membrane towards the periphery. I even think

that this peculiarity of the cocaine is apt to play an important role in iridotomies * * *.

* * * Since I use cocaine I have not seen a case of spastic entropium under a compressive bandage, even when there was a tendency to it * * *.

It is well known how difficult it is to examine the refractive status of the eyes of the newly born. In this direction cocaine will be of no small service by enlarging the palpebral fissure and the pupil and by removing the oscillating movements of the eye and the contractions of the lids. (I have not been able to convince myself of a lasting influence exerted by cocaine on nystagmus, although the involuntary movements of the eyeball seem to be reduced for some time in extent and frequency.)

* * *

CORRESPONDENCE.

The following letters have been received concerning Dr. Fiske's paper in the January number, on "Evisceration of the Eye-ball."

ZANESVILLE, Ohio, April 3, 1885.

Adolf Alt, M. D.:

DEAR DOCTOR.—I have read the article "Exenteratio sive Evisceratio Bulbi"—Graefe Bunge operation—reported by G. F. Fiske, M. D., in the January number of the AMERICAN JOURNAL OF OPHTHALMOLOGY. That this operation is original with Prof. Alfred Graefe, of Halle, there can be no doubt. But I do not believe that a similar operation has not been done by others before Prof. Graefe published his method. For who in performing the operation of abrasion of the eye-ball has not found, after incising the sclerotic, the contents of the bulb atrophied and presenting loosely in the now open bulb, and as such structures could only be a nidus of disease, has grasped them with forceps, drawn out the remains of choroid retina, atrophied ciliary muscle, diseased iris, and cut them off with scissors as close to the front region of the sclerotic as possible, leaving nothing but the internal denuded surface of the sclerotic and the latter membrane otherwise intact and the capsule of Tenon

unopened. In the winter of 1866-7, while lecturing before a class of one of the medical schools of Columbus, Ohio, and at the Ohio Penitentiary, I did the following operation on an adult, probably of fifty years of age (I write from memory): Desiring to abscise, I transfixed the sclerotic transversely in the semi-diameter and horizontally, about one-sixteenth of an inch posterior to the sclero-corneal junction, with a Beers' cataract knife. The upper section completed, the corneal flap was seized with forceps and the lower section affected similarly to the upper, with scissors. The lens was atrophied and the remains of shrunken retina, choroid and iris fell forward into the anterior opening, now made in the eye-ball, and being, attached near and back of the sclero-corneal junction, were seized with forceps and divided with scissors close to their attachments, in all the circumference of the sclerotic; and in doing this the diseased structures were drawn out so as to expose the anterior attachments to the sclerotic. The patient was chloroformed. In this case I did not bring the edges of the sclerotic or conjunctiva together, but the now eviscerated bulb was left open and the eye cavity and bulb were washed out frequently with disinfecting fluids, and iced compresses were applied to eye externally. The man made a rapid recovery and without complications. This operation differs in details from that Graefe, but the two are similar in principle; but Graefe is of entitled to the credit of publishing first and of formulating a plan, meeting the wants of every abscision, and for taking a bold stand against the wholesale enucleation of eye-balls as now so generally practiced. He seems to have been led to the adoption of his plan by the fear of sepsis through the lymphatic channels of the eye, due to enucleation as well as the ill results of the latter operation. It is a question if it would not be better to omit the sutures in the conjunctiva, that all discharges may flow out from the cavity of the sclerotic and it be reached by disinfectants.

From my favorable experience with abrasion I am disposed to believe in the Graefe-Bunge operation, but would prefer to omit the sutures. Certainly in this operation the parts which are the most vascular are removed, thus avoiding inflammation, and

at the same time, the terminals of the ciliary nerves are cut off, and also the branches of the long ciliary nerves dissected out of their grooves in the sclerotic, and divided posteriorly, and at the points at which they perforate the sclerotic, and leaving the comparatively non-vascular and insensitive sclerotic intact. If no sutures are employed I do not believe sepsis will occur through the few lymphatic channels formerly leading from the choroid through the sclerotic and into the lymph spaces about the eye-ball.

It remains to be seen what is the value of this operation. Perhaps it should be added that I referred to the operation of myself, at the meeting of the American Medical Association in June, 1883, before the Ophthalmological Section. See Journal American Medical Association, 1883, p. 299.

Should you think this hasty letter worthy of a place in the AMERICAN JOURNAL OF OPHTHALMOLOGY, please publish it.

Very Respectfully,

H. CULBERTSON, M. D.,

Capt. and Assistant Surgeon U. S. Army, Retired.

To the Editor of the American Journal of Ophthalmology:

DEAR SIR:—My attention has been called to the January, 1885, number of your journal. The first paper is by Dr. Fiske on "Evisceration of the Globe."

With your permission I will correct what appears to me to be an inaccuracy therein.

Dr. Fiske does me the honor to mention my name in connection with the operation but leads your readers to suppose that Dr. Graefe had covered all the ground assumed for him in Dr. Fiske's communication. This is not so.

Dr. Graefe in his original paper, a reprint of which I have by me, makes not the slightest reference to the *preventive treatment of sympathetic inflammation* by eviscerating the contents of the globe; this is done for him subsequently by Dr. Fiske, and it is

only just to assume that Dr. Graefe's views on that point are an afterthought.

I wrote to Dr. Graefe in reference to this very point shortly after the publication of his first paper claiming for myself the far more valuable end to be attained, viz., exemption from the danger of *secondary inflammatory affections of the sound eye*. I received a courteous reply for Dr. Graefe from Dr. Fiske in which he makes no claim for Graefe's operation except as a preventive of "meningeal complications" but after the receipt of my letter explanatory of my views, he publishes the article in your journal. For confirmation of the above please refer to *Centralblatt f. Augenheilkunde*.

I beg leave to remain, faithfully yours,

P. H. MULES,

MANCHESTER ENG., January, 1885.

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AMBLYOPIA ALCOHOLICA.

DR. S. C. AYRES, CINCINNATI.

Amblyopia alcoholica as a rule occurs in the steady drinkers, those who take their drams regularly and in liberal quantities, and who keep up their effects for a long time. Men who get on sprees and have intervals of abstinence from all intoxicating beverages for a season do not suffer from it, for the system has an opportunity to entirely recover from the effects of the alcohol. The susceptibility to the toxic influence of alcohol differs with different individuals, and is of course influenced by the quality and kind of liquor indulged in, as well as the quantity.

I saw one young man of *nineteen*, with white atrophy of both of the nerves from excessive indulgence in beer alone. He was grossly fat, and presented a beastly and disgusting appearance. As a rule, however, toxic amblyopia occurs at a later period of life and in men who have for a long time been toppers, and where the physical condition is beginning to succumb to the slow poison. Considering the number who indulge more or less freely in stimulants, and who persist in it for years, it is surprising that the sight is not involved more frequently. Indulgence in stimulants is generally associated with excessive use of tobacco, and

thus two toxic influences are brought to bear on the system at once.

If cases of amblyopia from either alcohol or tobacco, or both combined, are seen in the early stages, before atrophy of the nerves has set in, there is a chance for recovery, if the patient will submit to the treatment—*total abstinence*—but, unfortunately, this seems too much to ask of them. With the dread alternative of blindness before them, they will promise compliance with instructions, but often relapse into their old ways and suffer the consequences.

There is a difference of opinion among drinkers as to the toxic qualities of the various liquors. A patient whom I was treating stopped the use of brandy, whisky and wine, but still kept up for a while (until I discovered it) the daily use of beer, on the ground that beer could not hurt any one.

If a cure is effected, it must be by the co-operation of the patient, and a total abstinence from all beverages which contain any alcohol. The use of tobacco must also be limited to the smallest possible allowance. If tobacco is entirely forbidden, in the cases where both alcohol and tobacco have been freely used, the patient usually suffers from gastric disturbance unless a chew of tobacco or a cigar is allowed after each meal. This can, later on, when the case is progressing favorably, be cut off also.

CASE I.—W. J., 27, German, grocer and saloon keeper. The following history was obtained: He has noticed for several months that his eyesight has been failing, and for some weeks he has not been able to read ordinary print. He has difficulty in recognizing acquaintances, and in making change for his customers. He is a healthy-looking man, and has always enjoyed good health. He has never had any previous trouble with his eyes, and there are no spinal or cerebral symptoms to indicate a central cause for the amblyopia. The tactile sense is perfect, and he has no trouble in locomotion. He is in the habit of drinking beer ("pony" glasses) with his customers, but *never* gets drunk. He smokes moderately. Vision in right eye is reduced to counting fingers at 4', and with left eye is $\frac{2}{6}$ and reads Sn No 15. The fundus oculorum appear healthy, with the exception of the

optic disks, which are congested and hazy. There is no diminution in the calibre of the vessels on the disks.

Nov. 15, 1880. Hypodermic injection of strychnine; and ordered pills of nux vomica and gum camphor.

Nov. 18. $V = \frac{20}{c}$ l. and r. e. unchanged.

Dec. 13. Vision same.

Jan. 13, 1881. $V = \frac{20}{c}$ l. and fingers at 8' r. e.

March 7. $V = \frac{20}{L}$ r. and l. e.

May. $V = \frac{20}{XL}$ r. and l. and reads Sn 1.

June 27. $V = \frac{20}{XXX}$ r. and l.

Sept. 15. $V = \frac{20}{XXX} +$

He was not seen again until December, when vision was perfect in each eye. The treatment was left off during this time, and I have reason to believe that he carried out faithfully the total abstinence rules laid down. The unusual features of this case are the slowness of recovery. It was four months before his vision came up to $\frac{20}{L}$, and six months before he could read Sn No. 1. The improvement was so slow I began to feel discouraged, but the final result was very gratifying.

CASE II.—J. D. K., æt. 43, has noticed a gradual failure of vision for several weeks past, and for four weeks has not been able to read ordinary print. For years he has used stimulants, but for a few months he has been drinking excessively. He drinks whisky principally, and also chews and smokes to excess. He eats very little solid food.

Vision in right eye is $\frac{20}{c}$, and with left eye can count fingers at 2' only. The optic disks present an hyperæmic appearance.

I gave him an hypodermic injection of gr. $\frac{1}{24}$ strychn. sulph., and the next day vision in right eye was $\frac{20}{LXX}$, but left one unimproved. He did not remain longer under treatment, but continued the strychnine treatment after his return home, and in two weeks was able to read ordinary print again.

He followed instructions for awhile, but in a few months lapsed into his bad habits again, and finally died from their effects.

CASE III. J. M. R., 57, in good health, and very well preserved. His eyes have been failing for two months past, and for one month he has not been able to read ordinary newspaper print. There

are a few speculæ of opacity in the margin of the left lens, but in other respects the media are clear in both eyes. The disks appear somewhat paler than normal, but are not atrophied. For the past five years he has averaged eight segars a day, and five or six drinks of bourbon whisky.

He reads Sn 4 slowly with good light. $V = \frac{20}{1XX}$ with either eye. Gave hypodermic gr. $\frac{1}{4}$ strychn. sulph.

The next day $V = \frac{20}{1}$, and can read Sn 3½.

2d Injection.—On the following day $V = \frac{20}{XXX}$, and can read Sn 2½.

Gave 3d injection, and in afternoon of same day $V = \frac{20}{XXX} +$, and can read Sn No. 2.

Two months later he reports himself as able to read ordinary print with ease. He carried out the strychnine treatment at home.

In the last two cases the response to the influence of the strychnine injections was prompt and satisfactory, and this has been my experience rather than that of Case No. 1, where the eyes improved very slowly. What influence there was to interfere with the effects of the nervine treatment would be hard to state.

Pure and uncomplicated cases of tobacco amblyopia are in this country at least rather rare. I reported on Feb. 11, 1882, in the *Cincinnati Lancet and Clinic*, which I now add :

TOBACCO AMBLYOPIA.

It is seldom that we ever see a case of pure and uncomplicated tobacco amblyopia. The use of tobacco and spirits are so generally associated that their poisonous effects are diffused through the system simultaneously. We frequently see cases of amblyopia from chronic alcoholism, but all of them were consumers of tobacco to a greater or less extent. The resulting effect is attributed to the toxic influence of alcohol, and the *role* that tobacco plays is almost lost sight of. This is natural enough, for the toxic influences of the former are so much more powerful than the latter that they get the credit of doing the damage. Men do not abuse themselves with tobacco as they do with spirits, for it does not produce the same degree of exhilaration; still its

continued and excessive use will help to undermine the system and deepen and confirm the effects of alcohol.

Mr. Jonathan Hutchinson reported in the Royal Ophthalmic Hospital Reports (1872) a number of cases of tobacco amarausis. They were cases that had been under his observation for a long enough time to enable him to form a positive and decided opinion as to the final results. He attributes the amblyopia to excessive smoking, and shows from his cases that the failure in vision was coincident with an increased indulgence in tobacco. Some of the smokers were also drinkers; but the toxic effects of tobacco were considered as more potent. This was evidenced by the fact that 75 per cent. either recovered entirely or were greatly improved after quitting the use of tobacco. In his opinion, total abstainers from alcohol were more liable to trouble than those who used spirits moderately, the alcohol seeming to counteract the poison of tobacco. He also observed that after the recovery of vision, his patients were again able to resume the enjoyment of their pipes in moderation without detriment to their eyes.

I am disposed to think that tobacco amblyopia is very rare in this country. Alcohol has, undoubtedly, been the leading factor in all the cases of toxic amblyopia I have seen. The two factors are generally associated, and there is usually excess in both.

The following case I report as the only one of the kind which has ever come under my observation. It proves one point, that tobacco can seriously affect vision, and there is abundant evidence from other observers that atrophy of the optic nerve does follow its excess, as well as that of alcohol.

In this case the patient was not a smoker, but a chewer of the weed. In Hutchinson's cases the use of tobacco by smoking only is mentioned, and the same is true of cases mentioned by German writers. This arises from the fact that chewing is not nearly so common abroad as it is in this country.

I have never seen any statistics which mention excessive chewing of tobacco as a cause of amblyopia, which makes this case one of interest. There seems to be no good reason why chewing should not be as injurious as smoking. The contact of tobacco

with the mucous membrane of the mouth is as promptly, if not more promptly, felt in the brain, as the effects of smoke from a pipe or segar. Then, too, men can chew where they would not be allowed to smoke—as for instance at their work-benches and in places of business where there would be danger from fire, or objection to the odor of smoke.

Mr. E., æt. 50, a tall, slender man, but healthy and well preserved for one of his age. He had led a temperate life in all things but indulgence in tobacco. He was not, and never had been addicted to the use of intoxicating liquors, and smoked very seldom.

He had recently noticed a mist before his eyes, and had difficulty in recognizing his friends, and vision had failed so much that he could not read ordinary print. His sight had failed decidedly within the past few weeks, and he had at last become alarmed. He was in the habit of chewing ordinary plug tobacco, and used from one to two ounces daily.

Examination showed his vision to be $\frac{20}{60}$ r. e. and $\frac{20}{100}$ l. e. The ophthalmoscope showed a healthy fundus, with the exception of the optic disks, which were congested, and resembled those of a person suffering from chronic alcoholism.

I determined to try the influence of hypodermic injection of strychnia, and gave him $\frac{1}{100}$ gr. in the arm. In the afternoon, about four hours after the injection, his vision had increased to $\frac{20}{100}$ r. and $\frac{20}{100}$ l. e.

The next day his vision had not diminished, and a second injection was given, which brought his vision up to $\frac{20}{100}$, in the right eye, the left remaining, as it was yesterday.

He had to return home, and was ordered small doses of strychnine three times daily, to be continued until his return.

In twelve days he again presented himself, and it was found that vision was $\frac{20}{100}$ r. and $\frac{20}{100}$ l. eye.

The vision in the right or weaker eye had sunken a little, but the left had not lost anything. He could now read ordinary print with ease, and recognize objects and persons in the distance very well. The haze before his eyes had vanished; and objects were clear and distinct. Another hypodermic injection of strychnine was given, but it did not improve the vision appreci-

ably. He returned home and continued the internal use of the nervine for several weeks.

He quit the use of tobacco from the first day of treatment, and has not since indulged in it.

It is now three years since the above treatment, and he still maintains good vision. He has gained considerably in flesh, and enjoys good health.

PEROXIDE OF HYDROGEN.

BY F. ALLPORT, M. D., MINNEAPOLIS, MINN.

Peroxide of hydrogen, notwithstanding the dormant condition in which it has for years remained, is a remedy possessing great therapeutic value. It was discovered by Thenard, a French chemist, in 1818, and first introduced as a medicine by Richardson, of London, in 1858. It is produced by the action of hydrochloric acid on the peroxide of barium. Its formula is H_2O_2 , and its specific gravity 1.453. It is a colorless liquid, appearing exactly like water, but thicker in its consistency. Its odor resembles dilute chlorine, in taste it is astringent and rather metallic, and it remains liquid at zero. A temperature of 70° F. will cause oxygen to escape in bubbles, but when heated to the boiling point of water, oxygen will be rapidly evolved, almost with explosive force. It unites easily with water in any proportion, and, when thus united, the evolution of oxygen is less rapidly accomplished.

The peroxide of hydrogen is easily decomposed by many finely-divided metals and metallic oxides. Gold, silver and platinum cause it to give up an atom of oxygen and to be resolved into water, and fibrine and cellular tissue have the same effect. Ammonia, hydrocyanic acid, tobacco, aconite, and most other narcotic substances, not only render the peroxide of hydrogen more stable, but actually prevent it from oxidizing other substances. It causes sugar and starch to evolve carbonic acid, but albumen, gelatine, urea and cutaneous tissue have no effect upon it. Peroxide of hydrogen bleaches litmus and many vegetable colors, and when placed upon the tongue bleaches it, and for a time destroys sensation.

By its means hair may be bleached and turned to a golden

color, and it is much used by the demi-monde for this purpose.

Internally the peroxide of hydrogen has not been practically demonstrated to possess especially meritorious features, but locally it forms an exceedingly valuable addition to the armamentarium of antiseptic surgery. As has been mentioned, its formula is $H_2 O_2$, but the preparation is of so unstable a character that it readily decomposes and liberates one atom of oxygen upon contact with various substances, pus among the number.

The oxygen thus liberated is in a nascent condition, is exceedingly active, and will force the escape of pus from any cavity in which it may be contained. In this proneness to decomposition and liberation of nascent oxygen, lies its value as a cleansing and antiseptic agent.

While peroxide of hydrogen is of great value in the treatment of wounds, ulcers, &c., it is especially useful in treating cavities difficult of access. And it is on this account dentists have found it of such singular utility as a local application in alveolar abscesses. When instilled into a septic cavity contact with pus immediately causes the liberation of oxygen, and, being nascent and active, every portion of the cavity, however remote, is cleansed of the products of decomposition.

This process being several times repeated, the cavity will be found entirely bereft of all purulent deposits, and in a thoroughly antiseptic condition. The foulest and most putrid cavities can in this manner be rendered utterly devoid of unpleasant odor.

I first commenced using this agent in a very foul and unhealthy mastoid cavity, after the cells had been exposed by operation. Gratified by the results obtained I have since continued its use, whenever its peculiar and remarkable qualities have rendered it admissible.

Peroxide of hydrogen is valuable in cleansing and disinfecting the middle-ear in suppurative inflammation, preceding and in conjunction with the ordinary insufflation of boracic acid, iodoform, &c. In using it for such affections a few drops are instilled into the meatus, the patient lying on the opposite side. In a moment bubbles will be expelled, the meatus is then quite

thoroughly dried and a few more drops are instilled. This operation I repeat until effervescence ceases to occur, when the ear should be wiped thoroughly dry and insufflation made. If the aperture is quite small I inject a few drops through the opening by means of a middle-ear syringe, which will cause the expulsion of any pus contained in the middle-ear. I have found progress much more rapid by this treatment than by the use of insufflation alone.

This agent is efficient, also, in all purulent affections of the eyes. It can be used undiluted, but it is better diluted one-half or one-third, as circumstances may dictate. This suggestion is also applicable when used in the ear. I have found purulent affections of the tear-passages yielding, by this means, much more readily than by any other method. I generally combine the usual probing, etc. with it, and simply use it as an injection preceding the passage of the probe. I usually employ the diluted form, and inject it into the tear passages, by means of the lachrymal syringe. I repeat these applications two or three times at each treatment, squeezing out, by pressure over the canaliculus, as much of the preceding injection as possible.

I have found peroxide of hydrogen successful in severe cases of gonorrhœal ophthalmia and ophthalmia neonatorum. Cleanliness being one of the essential features in the treatment of these cases, I have heretofore, every hour, as thoroughly as possible, cleansed the eye by means of a solution of boracic acid. This accomplished the purpose to a certain extent, but the peroxide of hydrogen is far superior in its cleansing and disinfecting properties, and much easier to apply. It is quite difficult and often impracticable to do as the books advise, viz., insert the end of a smooth-pointed syringe into one angle of the eye and then inject. The lids are often so swollen as to render this almost impossible, and in unmanageable children it often becomes quite dangerous, as they are likely to do damage to the eye-ball.

In using this agent for such affections the eye should be as widely opened as possible, a few drops instilled, and quickly closed. The eye should be kept as tightly closed as possible, in order that the escaping oxygen may find its way to the remote parts of the lining mucous tract. Bubbles will soon escape from

between the lids, and the parts should then be wiped as dry as possible, and the operation repeated several times, that thorough cleanliness may be insured. This need not interfere with the other methods of treating these diseases, such as nitrate of silver, iodoform, &c. I simply advocate it as a substitute for the washing and cleansing process. It may be done every hour, or four or five times a day, as seems best. In purulent and ulcerative keratitis I have obtained better results with the peroxide of hydrogen than would have been probable by other methods.

In all purulent diseases of the eye or lids, where we wish to maintain a clean and antiseptic condition of the parts, I would cordially recommend its adoption.

EYE CLINIC.

BY W. CHEATHAM, M. D.,

Lecturer on Diseases of Eye, Ear and Throat, University of Louisville.

Mr. H., aged 42, a stout, healthy farmer, came to me complaining of loss of vision in both eyes. It appeared to him as if he was looking through a heavy veil or fog. It had been coming on for four months.

Vision = $\frac{1}{6}\frac{5}{6}$ each eye; no error of refraction; color perception good. Ophthalmoscope shows no deviation from normal, except a peculiar "brick-dust" color of nerve entrance. Drinks 18 or 20 glasses of beer per day; smokes pipe a great deal. The case I diagnosed as one of amblyopia, from over-use of beer and tobacco. Cut the use of both off short. My belief is that this is the only way to do. Gradual disuse is a failure. I commenced the hypodermic use of strychnia nit., gr. $\frac{1}{60}$, and increased slowly to gr. $\frac{1}{6}$, when the physiological effects of the strychnia were reached. I then put him on ext. nuc. vomic. and zinc phosphide in pills, which was continued, at intervals, for three months, when he was discharged with vision $\frac{20}{20}$. Mr. H. gave no history of any constitutional trouble whatever. Had never had syphilis. Is the father of five healthy children.

Dr. F., aged 48, a physician of twenty-five years' practice. General health good. Has noticed his vision failing for several weeks—a peculiar haze or cloud before his eyes; neither headache nor vertigo. Vision = $\frac{5}{6}\frac{5}{6}$. Ophthalmoscope shows a dead red nerve entrance, simulating closely the appearance of the surface of a common brick. This appearance of the nerve entrance is, in my opinion, common in alcoholic and tobacco amblyopia. Dr. F. does not use alcohol in any form, but says he has smoked as many cigars as any man living. The latter I cut

off immediately. In 48 hours his vision was $\frac{2}{L}$. In three weeks under the use of the ext. of nuc. vomic. and zinc phosphide, and total disuse of tobacco, his vision was $\frac{2}{XX}$.

In the last few years I have seen five other such cases. I know in the minds of many the efficacy of strychnia is doubted. My experience with strychnia alone is not very encouraging. Still I give my patients the benefit of the doubt. I have used, by gradually increased doses, as much as gr. $\frac{1}{8}$ before getting the physiological effect; often I get it at gr. $\frac{1}{XX}$. I have seen the vision jump from $\frac{2}{C}$ to $\frac{2}{XX}$ from one injection, but next day be back to $\frac{2}{C}$ again. Of course it is difficult to differentiate the effects of the strychnia and the removal of the original cause. I feel sure I have gotten good and lasting effect from the combination of ext. of nux vomica and zinc phosphide. In several of my cases of alcoholic and nicotine poisoning I have failed to get vision over $\frac{2}{XL}$. I sometimes get favorable results from pot. iodide, and in cases in which I am positive there is neither syphilis nor scrofulosis. In one case I allowed the patient to continue the use of the alcohol and tobacco, as of old, and succeeded in a slow but sure improvement of vision up to $\frac{2}{L}$ under the use of camphor, ext. of nux vomica and zinc phosphide. Could not get vision above $\frac{2}{L}$ though until the alcohol and tobacco were stopped, when his vision increased to $\frac{2}{XX}$. This case, to my mind, is conclusive that we do get good effect from medication. I should have said I tried total abstinence with increase of vision to $\frac{2}{XL}$ as a result, and a return of loss of vision with a return to use of alcohol and tobacco.

Mary M., aged 12, full of struma; rather feeble-minded. She is one of the worst cases of trachoma I ever saw. Lid tremendously thickened; a diffuse, thin opacity of both corneæ; slight pannus. She has been taking, during the time I have treated her, pot. iod., hyd. bichlor., syr. iod. iron, and cod liver oil. Locally I had tried argent. nit. in strong and weak solutions, cupr. sulph., lapis divinus, tannic acid in powder, powdered boric acid, scarification, and shaving off the trachomatous bodies with scissors and knife, with no lasting good result. I also tried the jequirity infusions, and afterwards the pulverized jequirity was put in daily for a week (the powder was effective with others)

without producing a particle of inflammation. I of course was feeling greatly discouraged. The idea of digestion of the trachoma occurred to me. I had Mr. J. A. Flexner, of this city, to prepare for me the following :

R _x	Ext. pancreatis (Fairchild's.)	-	-	-	℥ij
	Soda bicarb.	-	-	-	gr. x
	Pv. sacch. alb.	-	-	-	℥iv

I everted the lids daily, and packed the powder in them thoroughly, keeping the eyes closed for 15 or 20 minutes each time. In six weeks the trachoma is reduced fully one-third. I hope to report this case as recovered in the not distant future.

CASE OF CYST OF THE CILIARY BODY.

BY DR. JOSEPH AUB, CINCINNATI.

Cystoid developments in the iris, the results of injury and usually produced by engagement of the iris in the cicatrix following such injury, are not rare occurrences. The location of such cysts is usually at the angle of the iris and they extend thence into the anterior chamber. The occurrence of such cysts in other portions of the uveal tract has been mentioned, as far as I can find in the literature at my disposal, but a single time and that by Alt, of St. Louis. In his case the cyst was discovered in the æquatorial region of the eye and was idiopathic. I have therefore thought that it would be of interest to the profession to report a case which came under my observation in March, 1885, and which I have carefully watched since. At first there was some doubt in my mind as to the correctness of the diagnosis first made, but repeated examinations of the patient gave me ample opportunity to verify the diagnosis as well as to observe the steady growth of the cyst.

John Sheahan, æt. 27, was cut in the forehead and right eye on November 5, 1884. P. claims the eye-sight was immediately affected. When brought to the physician for treatment there was considerable swelling of the parts, the forehead had two ugly gashes passing down through the upper eyelid and one extending into the lower. The upper lid margin was not divided. Stitches were introduced to unite the lips of the wound and ice applications were ordered. No trouble of the eye was discovered at the time, perhaps not looked for. Union of the wounds occurred by first intention and the stitches were removed in the course of a week. The lid still remained swollen and heavy until the end of December. P. observed the

trouble with the sight immediately after the removal of the bandage and claims the sight has diminished gradually since. He has no pain, no redness in the eye. At the inner side of the cornea about 3''' from corneo-scleral margin is a scar about 4''' in length and perfectly vertical in direction. The conjunctiva and sclerotic are firmly united at this point, the scar is attenuated and the dark choroid shows through. There is a decided depression of the cicatrix throughout its entire extent, anterior to it the eye is becoming staphylomatous. Cornea is perfectly clear, anterior chamber free, pupil oval and drawn towards the cicatrix. Iris brilliant, its outer pupillary margin attached to lens capsule. Lens clear, except on the posterior surface are seen small pigment deposits, possibly due to hemorrhagic clots. Just behind the lens and springing from the ciliary region is an oval body, with its larger end extending half way across the eye and into the vitreous. By oblique illumination the edge of the cyst looks white and can be clearly defined. Its surface is dotted here and there with pigment deposits. By direct examination with the ophthalmoscope the cyst walls are transparent and the details of the fundus can bedimly recognized through them. $S = \frac{2}{cc}$. No improvement with glasses. Atrop. sulph. was ordered and P. told to return in two days. On his return the pupil was found irregularly dilated. Lens was bulging upwards and inwards and anterior chamber correspondingly shallow at that point. The entire posterior surface of the iris, upwards and outwards, was found attached to the lens capsule. The cyst can now be distinctly seen from its apex to its point of origin in the centre of the cicatrix about $\frac{1}{2}$ ''' behind the suspensory ligament. It pushes the lens forwards and is extending further into the vitreous. The vitreous has become slightly cloudy, S. being reduced to $\frac{6}{cc}$ T 1. An ointment of unguentum hydrarg. 5 iij. and ungt. bellad. 3j. was ordered over the forehead at bedtime and the sol. atrop. was stopped. Two weeks later the eye was in the same condition, except that the tension had become normal. No growth of the cyst.

The patient was kept under observation until May 15, when the cyst had extended beyond the median line. Its outlines could

be distinctly defined in the now perfectly clear vitreous. Ant. chamber was still shallow upwards and inwards and no other change noticeable. S. had improved to counting fingers in nine feet. P. left the city for the North and has not been seen since.

CATARRHAL OPHTHALMIA—"PINK EYE."

BY L. WEBSTER FOX, M. D., OPHTHALMIC SURGEON TO THE
GERMANTOWN HOSPITAL.

The large number of cases suffering with this disease, which have recently come under my care at the eye clinics of the Germantown and Jefferson Medical College Hospital and in private practice, led me to investigate the cause and spread of the present epidemic raging about Philadelphia. This disease was quite rife among domestic animals several years ago, particularly among horses, and it was at this time that the name "pink eye" was given the disease by the laity on account of the peculiar pink color of the eye-ball.

Catarrhal ophthalmia has been known suddenly to attack a great number of persons who happened to be exposed to the same general exciting causes and we have accounts of epidemics where whole battalions of troops were affected and where the disease spread itself more extensively, attacking many of the inhabitants of a town or district.

Assalim, for example, relates that in 1792 several battalions of the Duke of Modena's troops were affected at Reggio. These troops were taken to a distant part of the country and passed the first night after their arrival under the spacious porticos of a convent looking to the North, in the lowest part of the town and near the trenches of a citadel. Many of the soldiers contracted violent catarrhal ophthalmia, which was attributed to the dust of the straw on which they had slept, and not to the moist and cold air of the place, which, as Mackenzie says, was the true cause, and which was so much the more likely to prove hurtful.¹

In 1778 the whole neighborhood of Newbury in England was afflicted and in 1803, Paris was the seat of widespread epidemic, while in 1861 Vienna did not escape.

The secretion from an eye infected with this disease is the medium through which the disease is propagated. These secretions may be passed from animal to man, also from man to

1. Mackenzie on Diseases of the Eye. pg. 440.

man, and in this manner is the virus disseminated through communities. I have also observed that the discharge in catarrhal ophthalmia, when conveyed to the mucous surface of the conjunctiva either by fingers or a towel, is apt to excite a more violent discharge than the original ophthalmia. No class of people are exempt from it; proving itself, however, the more virulent and intractable among the emaciated and neglected. Eyes that are constantly congested or suffering from any form of conjunctivitis, produced by any cause, are prone to become the seat of the disease. It reproduces itself by direct contact only.

This disease is not limited to the conjunctivæ, but the lining membrane of the nose may become the seat of the affection, a complication which I have on several occasions observed. I think it probable, that the ophthalmia which attacked the equine race two years ago was a muco-purulent conjunctivitis excited either by atmospheric cause or the stigma of certain weeds which grew in the grass fields, and cured with the hay, but that it afterward degenerated into a contagious, perhaps infectious disease; that is to say, that it was propagated by actual contact of the discharge or perhaps from the miasmata floating through the air.

For the last three years sporadic cases have from time to time presented themselves at our clinique. I attribute the present epidemic due, in a manner, to the extreme cold weather of last winter and an atmosphere laden with particles of dust which produced a mild form of conjunctivitis in many individuals who coming in contact with sporadic cases aided in propagating the infection until the disease became epidemic, and again I have found upon inquiry that many horses are at present afflicted. A coachman was recently under my care who traced his attack to a horse that he was attending, suffering with "pinkeye". Several members of this man's family contracted the disease. Another family traced the source of their trouble to a favorite dog suffering with "bleared eyes," not noticed by the parents until their attention was called to the fact by myself. Another patient declared his eye trouble developed in about ten hours after a piece of mucus was blown into his eye by the snorting

of a horse that he was leading by the bit, this animal having a slight discharge from his eyes and nostrils at the time.

The disease is ushered in by a sensation of roughness of the lid as if a foreign body had found its way into the palpebral sac—profuse lachrymation which in a few hours changes into a muco-purulent discharge. At this time the conjunctiva becomes swollen and the eye red, and at times painful. The external gritty diurnal pain arises from pressure on the nerves of the conjunctiva and eyelids, whereas the internal, pulsatory nocturnal pain depends on pressure on the ciliary nerves which is reflected to the branches of the fifth nerve radiating from the orbit, especially the supra-orbital branch. Pain is not an early symptom, but usually manifests itself from twelve to twenty hours after the discharge and œdema of the lids. At this stage the Sneiderian membrane becomes inflamed and the patient complains of a “cold in the head,” while in severe cases a feeling of general malaise comes on and temperature rises.

The prognosis is favorable when treatment is instituted early in the disease; when neglected the sequelæ of granular lids may be anticipated. I have at present a patient under treatment suffering from granular lids who dates her trouble to an attack of “pink eye” five months ago. Inasmuch as the ophthalmic surgeon rarely sees these patients in private practice until serious complications arise, it is well for the general practitioner to be informed upon the more recent methods of treatment, as it is to him that an appeal is made after such domestic remedies as an infusion of tea leaves, sour milk, etc., have proved their uselessness. The treatment of the disease is simple—any mild astringent will alleviate the trouble. A favorite remedy and a successful one is a 50 per cent solution of boroglyceride applied every three hours. The ointment of the boroglyceride may be applied to the edges of the lids at night, or lotio chlorini, applied ad. lib. as well as lotio boracis—arg. nit. grs. iij. to ʒj. may be relied upon as a sovereign remedy to abort the discharge. A simple domestic remedy, one convenient upon all occasions, is a tablespoonful of pulverized alum to half a pint of water—the eyes to be bathed freely every three hours.

ABORTION FOR THE ALBUMINURIC RETINITIS OF PREGNANCY.

BY LUCIEN HOWE, M. D., BUFFALO, N. Y.

It is no new thing to propose abortion for the albuminuric retinitis of pregnancy. The attention of the profession has been called to the subject before, especially a few years ago by an article by Dr. Loring of New York. It is evident, however, that its importance is not sufficiently appreciated by many practitioners, or else, being timid, they fear to violate the opinion of some authority in obstetrics—doubting just when interference may be necessary.

The object of the present paper is, therefore :

1. To cite a few cases illustrating the fact that the danger to vision in this disease often is in proportion to danger to life.
2. To show that under such circumstances the operation would be warrantable even from the obstetric standpoint alone.
3. To formulate, if possible, some of the indications as to the time when interference is necessary.

Without further introduction I can begin at once to call attention briefly to a few illustrative cases. The different results of recovery, blindness or death will be commented upon later. At present I wish simply to show that such a liability exists. The files of any medical journal will furnish evidence unfortunately of the kind referred to. I therefore turn to a popular publication—*The London Lancet*—and select a few examples.

In 1875 Dr. Jabes Hogg¹ reported there a case of uraemic poisoning, epileptiform convulsions followed by coma, but ultimate recovery with total loss of sight. In the same journal, 1878, Drs. McNamara and Potter give a case of retinitis albuminurica in which the vision improved somewhat after confinement.

In the *Lancet* of April 24, 1879, Dr. W. Alfred Henshaw² cites the case of a woman who became pregnant in '78, and blind from albuminuric retinitis in November, but vision im-

1 1875: pp. 823-824.

2 1878: Vol. II., p. 824.

proved soon after, when a miscarriage came on. Mr. Henry Power,¹ M. R. C. S., cites a case of albuminuric retinitis in a recent number of the *Lancet*, in which the woman was at one time totally blind, and after partial apparent convalescence died in the third or fourth month of a second pregnancy. He says, "this is evidently a case of albuminuria intensified by each pregnancy and showing in a very marked manner the influence which pregnancy exerts over the progress of the disease." Herter² reports a case of albuminuric retinitis in a woman in the eighth month of pregnancy, in which detachment of the retina occurred with accompanying blindness in both eyes.

At a meeting of the Buffalo Medical Association held May 6, 1883, Dr. Cronyn reported a case of a woman who had impaired vision in one pregnancy, but recovered. In a second it appeared earlier and amounted to absolute blindness. He produced artificial labor in the eighth month, but she remained blind and died three months later.

It is certainly no uncommon thing to have a woman date the loss of vision from about the time of a confinement. For awhile I was very skeptical as to there being any connection between the two events, appreciating how naturally an imaginative person might misjudge a simple coincidence, but I am satisfied that in many instances the blindness was due to the pregnant condition. A formidable objection to such a conclusion was that only one eye remained blind, whereas albuminuric retinitis affects both, but a close examination of the optic nerve and retina in these afflicted eyes often shows that the atrophic condition there presented is just such as follows neuro-retinitis. The simple fact was, that in one eye the effusion absorbed and vision improved, and for some unknown reason the process advanced to atrophy of the nerve and blindness resulted. Any oculist can probably turn to several such examples by consulting his record of cases. I select a few.

April 16, 1880, I was consulted by J. C. E., an intelligent woman of 44, who stated that at the time of a confinement twenty-four years ago she was severely ill and the vision in

1 1880: Vol. I., p. 758.

2 Herter, *Annales de la Charité*, 1877, p. 519.

both eyes was much impaired, but afterwards the right improved while the left gradually grew worse. An examination of the interior shows that the right eye is quite normal, but in the left there is a partly atrophic condition of the disc and other changes such as accompany neuritis with neuro-retinitis of this kind. Examination presented a condition similar to that described.

Unfortunately there is sometimes no question as to the cause of the impaired vision, and this persists in both eyes for a very long time, or even permanently, to a degree which amounts practically to blindness. For example, on the 30th of July, 1883, I was consulted by a lady in regard to albuminuric retinitis. Six months previously, when about three months pregnant, she noticed a failure of vision ; by the early part of January she could not see to read, and before April she was totally blind. Premature delivery was urged on account of the albuminuria and other symptoms, but as a prominent physician in the neighborhood objected on legal grounds, the operation was postponed. Fortunately nature came to her relief, and the lady aborted in the eighth month, the labor being attended with convulsions. A final example will suffice, and this is unfortunately a most typical one. On the 4th of April, 1883, I was consulted by a patient in regard to a loss of vision of this kind two years previously, when in the seventh month of pregnancy the vision began to be impaired. This grew worse until she was almost blind. At that time, May 24, 1883, she had a miscarriage, and soon after the vision began to improve. The changes for the better were slow, but ultimately she could read large print, about Jaeger test type No. 10. Unfortunately she became pregnant again, and again the vision grew worse, but this time at an earlier period and more completely than before. By the sixth month she was virtually blind. A miscarriage occurred in the eighth month, but only slight improvement of vision followed. Various methods of treatment were tried with little, if any, success. At best she could count fingers with the right eye at six feet and with left at fifteen inches. She died from the effects of the albuminuria in the last of May, 1884.

Enough has been said, I think, to show the importance of the subject, and the fact that life is often endangered when the

vision is. This naturally brings us to the second point, namely, that on account of this double danger, the production of abortion is occasionally advisable. From purely an ophthalmic point this proposition requires no discussion. Let us only see what is the opinion of obstetricians. Among the strong advocates for the induction of labor in cases of albuminuria I should mention first of all the late Professor Elliot of Belleville College. The opening chapter of his obstetric clinics treats of the relations of albuminuria to pregnancy, and this he begins by citing the case of a woman who, together with other symptoms of that complication, suffered from disturbance of the eyesight; the usual treatment for such cases was carefully followed out, but she was allowed to go to full term and then died soon after confinement.

Professor Elliot gives a number of cases which are of interest in connection with our study.

No. 7 is that of a young woman with albuminuria. In the third month a miscarriage occurred, but the patient sank and ultimately died.

No. 8 is that of a woman of 36, in the ninth month. She had albuminuric eclampsia and complained of a "blur over the eyes." The cervix was dilated with the fingers, and with the douche labor was brought on, but she died the next day.

He says,¹ "unless the decision to be arrived on account of existing eclampsia or other serious contingency, if the result be not satisfactory hostile criticism will not be withheld; and if it be satisfactory and both lives be saved, it may be suggested that the operation was unnecessary, meddlesome and hazardous."

Playfair says,² "I believe that, having in view the undoubted risks which attend this complication, the operation is unquestionably indicated and is perfectly justifiable in all cases attended with symptoms of serious gravity. It is not easy to lay down any definite rule to guide our decision, but I should not hesitate to adopt this resource in all cases in which the quantity of albumen is considerably and progressively increasing, and in which treatment has lessened the amount, and above all in every case

1 Same, p. 39.

2 System of Midwifery, p. 201.

attended with threatening symptoms such as headache, dizziness or loss of sight.

The risks of the operation are infinitesimal compared with those which the patient would run in the event of puerperal convulsions supervening or chronic Bright's disease becoming established. As the operation is seldom likely to be indicated until the child has reached a viable age, and as the albuminuria places the child's life in danger, we are quite justified in considering the mother's safety alone in determining on its performance. Fordyce Barker¹ says: "I have no hesitation when the symptoms of albuminuria are of so grave a character that there is every probability that their continuance will result in the death of the mother, in advising and urging that labor should be brought on. I have never regretted giving this advice. The only regret that I have ever had on this subject has arisen when such action has been too long postponed by baseless hopes on the part of those with whom I have been associated. The success or non-success of the measure has nothing to do with the moral question.

Prof. Lusk² gives due weight to the opinions of others in favor of procrastination by saying "My own convictions are clear, that so soon as grave cerebral symptoms develop, the period of folded hands has passed." Moreover it is necessary to take cognizance of the well being of the foetus which is threatened by the continued circulation of urea in the natural blood.

Bedford³ is about the only writer who hesitates in making the operation at once, and consents to wait till nature initiates the process. Prof. Carl Braun⁴, of Vienna, states that in puerperal convulsions the fatality to the mother will average thirty per cent. It is more fatal to the foetus than to the mother when it comes on before delivery. Kelian up to 1883 had gathered from various sources 161 operations, and of these it appears that considerable more than one-half of the children are rescued with the insignificant mortality of one in fifty mothers. Many other au-

1 The Puerperal Disease, p. 82.

2 The Science and Art of Midwifery, p. 536.

3 The Principles and Practice of Obstetrics, by S. G. Bedford, p. 674.

4 Theory and Practice of Obstetrics, p. 454, 1 d., p. 447.

thorities might be cited and similar observations referred to, but in view of these statements there can be no doubt as to the weight of authority concerning the general question of the abortion. It remains only to determine, if possible, some of the factors which indicate the time for interference.

In order to draw a conclusion with some degree of accuracy concerning this important point, I have analyzed all the cases which I could find published as far back as 1870. These tend to show that when the vision begins to be impaired only in the last two weeks of pregnancy, recovery follows almost invariably. Of those described as being in the eighth month or thereabouts when the retinitis commences, not one-half recovered and several did not materially improve. Finally, when this began earlier than what was estimated, as the middle of the seventh month, when nature did not interfere by bringing on a miscarriage, and when the patient escaped with her life, it was only to remain blind forever afterwards.

But it may be asked, is premature delivery warrantable in every case where albuminuric retinitis appear as early as eight or surely in the seventh month. Such a rule would be not only dangerous to the woman, but liable to criminal abuse. Evidently the circumstances will modify the course to be pursued. The time at which the retinitis appears and its degree is perhaps the most important factor in the problem to be decided, but next to this the quantity of albumen and the relative time of its appearance gives an indication as to the probable result.

Inasmuch as this is the cause of the dreaded symptoms, we naturally would expect the degree of danger to increase with the amount of albumen found. This is a convenient rule and in general a reliable one. As small as a tenth of one per cent. is sufficient to attract attention. The presence of one per cent should excite apprehensions, and so great a quantity as two or surely three per cent, is usually an indication of great danger; still we must be on our guard against sources of error; for example, I know of a case in which the urine of a patient had inadvertently been allowed to stand so long that considerable evaporation took place, and the amount of albumen shown in the analysis was really greater than that existing. On the other hand,

if diuretics are administered for the disease, and the quantity of water excreted is thereby increased, the proportion of albumen might appear relatively to diminish, although in reality it remained the same. Taking these sources of error and frequent variation into account, I can not think, therefore, that the amount of albumen is of as much importance as the time in the pregnancy at which it first appears. In the last month or six weeks it is said by obstetric writers to be no very infrequent occurrence, and not to be then of great significance. This is certainly substantiated by the experience of the oculist, but when it appears in the seventh month, in the sixth or surely earlier, and when it persists in spite of variations, it is certainly of grave importance. The vitiated blood then exerts its poisonous effects upon the retina and upon the vital organs of the mother or child for a long time, and no one can say how soon or in what way these effects may be shown, whether by sudden blindness, by a convulsion, or by the expulsion of a dead child. As we may give small doses of some medicine for a long time without apparent effect, and then there follows an explosion of violent symptoms, so does the history of these cases show that the prolonged existence of even a small amount of albumen may lead us to expect serious symptoms which may appear quite suddenly.

I think a sufficient amount of evidence has been adduced to establish the three points referred to, and in conclusion, it seems fair to infer that, the induction of labor is warrantable when the retinitis appears in a comparatively early stage of pregnancy and persists in spite of proper treatment, but is not warrantable in the last few weeks, in spite of the greater ease with which it is accomplished, unless the inflammation is usually severe.

MELANOTIC FIBRO-SARCOMA OF ORBIT REMOVED
TEN YEARS AFTER ENUCLEATION OF THE
EYE-BALL CONTAINING A PIGMENTED
GROWTH.

BY F. BULLER, M. D.,

Professor of Ophthalmology and Otology McGill University Montreal.

On May 27 of the current year Mrs. K., aged 48, came to me for advice on account of a painful affection of the right orbit, which for a number of years had been causing her a great deal of discomfort and annoyance. The history of the case as given in a communication from her medical attendant is as follows:

“About the year 1863 or 1864 Mrs. K. accidentally noticed she was minus the sight of the right eye. The pupil was dilated but did not present the appearance seen in fungus haematodes or encephaloid of the eye. At this time the optic nerve must have been affected. On ophthalmoscopic examination I discovered no disease of notice.

About the year 1865 she suffered from severe pain in the region of this eyeball which would shoot and extend from the occiput of the same side to the eye or from the eye to the occiput. About the year 1868 she suffered from an exceedingly severe attack of inflammation of the optic nervous apparatus eyeball and eyelids, and there were recurring attacks of inflammatory and neuralgic conditions of the lids, eye, etc., till about the year 1872 or 1873, when the other eye began to be affected as I thought through sympathy. This sympathetic affection continued with remissions and exacerbations until it was evident the left eye too would be wholly destroyed. I therefore advised the removal of the right eye which during all this time was giving her a great deal of pain. She finally consented to the operation which was done by the late Dr. Robertson, of Albany, in 1874.

On cutting into the eyeball after its removal the vitreous humor was quite dense, not like cartilage and not solid, it was

dark; if I rightly remember it was black and contained several spiculæ of bone, some of which were sharp pointed. I preserved for a long time one of these bones which was one-fourth of an inch or more in length, and this reminds me that for a year or two she had complained of a prickling sensation in the eyeball caused no doubt by these sharp points. She made a good recovery from the operation and the sympathetic trouble in the other eye subsided.

After two or three years the same pains and recurring inflammatory affections of the tissues of the lids and orbit reappeared and have persisted more or less ever since. Three or four years ago the orbit began to fill up. Two years ago next autumn it was about filled; she then had an exceedingly severe time with pain and inflammation of the surrounding tissues in close proximity to the orbit. The swelling in the orbit burst and then subsided very much but in a few months began to increase again."

The remainder of the communication, dealing with the family history of the patient contains nothing of importance. In some points the patient's own statements differ materially from those of her physician. She stated that about a year after the loss of vision was first noticed the eye swelled up and burst and then shrank; for some time afterwards she wore an artificial eye, but had to abandon its use owing to the discomfort it caused; that pain in the orbit and head returned within a year after the removal of the diseased eye, and were usually most troublesome during the early part of the night, though sometimes she could hardly get any sleep all night long on that account. After suffering for some hours sudden relief would occur with a copious flow of tears from the conjunctival sac; that the inflammatory swelling which occurred two years ago subsided without any discharge other than a watery fluid.

In the absence of a minute examination of the diseased eyeball after its removal the nature of the case cannot of course be positively ascertained though there is strong reason to believe the eyeball was filled with a pigmented sarcomatous growth at the time of its removal ten years ago.

The left eye is entirely normal and shows no trace of sympa-

thetic trouble. Mrs. K. does not appear to have suffered in her general health and presents no sign of functional or organic disorder other than that within the orbit. The eyelids on the affected side are slightly swollen and darker than on the other side; and there is some lachrymation from the empty conjunctival sac, but the conjunctiva is perfectly healthy. *Only in the centre of the sac there is a small area of a darker color than elsewhere, transversed by a few dark tortuous veins.* Here too the conjunctiva rests upon a firm mass which is not subject to even a trace of muscular movement.

The orbit is in fact two-thirds filled by a firm somewhat nodular mass, not adherent to its walls at the periphery but not movable to any extent.

Pressure on this mass from below upwards causes pain but not from above downwards. There is nowhere the least suspicion of fluctuation. Without forming a positive opinion as to the nature of the growth though the dark patch over its central portion was strongly suggestive of its pigmented character, I advised its removal with a view to remove the almost constant pain caused apparently by its presence. To this the patient readily consented. The tumor was removed June 3. In order to have plenty of room I divided the outer canthus, then dissected back the healthy conjunctiva; with curved scissors and the fingers I removed an isolated ovoid mass of a dark color enclosed in a delicate capsule and having a somewhat lobulated surface; this mass two and a half cm. in length, two cm. wide and one cm. in thickness, and quite firm in texture. After its removal the apex of the orbit was found to be occupied by a considerable quantity of softer material which was cleared out with the curved scissors as completely as possible and when the moderate bleeding had ceased chloride of zinc paste was applied to the deep portion of the orbit in the usual way. The patient made a satisfactory recovery and returned home at the end of a week. As yet there is no return of the growth though it is of course too soon to expect any such result, but she remains free from pain and in so far success has been achieved by the operation.

The ovoid mass first removed showed on section a mottled appearance being divided into lobules of a dark color and irregular

as to size and shape, by broad bands of pale fibrous tissue. The central portion of the lobule was made up almost entirely of cellular elements, but even here in these sections logwood staining brought out a delicate linear meshwork of white fibrous tissue so arranged as to give the appearance of their being placed in rows in its long meshes.

In parts the cells were nearly all crowded with granules of a golden brown or black pigment, which for the most part was uniformly distributed in the cell plasma. Very few have more than one nucleus, which was always remarkably distinct. In certain localities pigmented and non-pigmented cells were present, in about equal proportion, and in others none were pigmented.

Throughout the growth the prevailing character of the cells was spindle-shaped with long processes, or oat-shaped, though round cells were not wanting in any of the cellular parts, and in places were in excess of the others. Multipolar cells were extremely rare, though not entirely wanting.

As a general thing the non-pigmented cells were smaller than the pigmented. The others were precisely similar in character and arrangement.

The pale portion of the tumor consisted almost exclusively of white fibrous tissue; the same is true of its capsular envelope; yellow elastic fibres were also present in the peripheral parts of the fibrous intersection of the growth. The growth was by no means a very vascular one, though traversed by a network of delicate capillaries. The larger blood-vessels were characterized by their very thick walls and relatively narrow limits, a circumstance which may in some measure seem to account for the slow development of the tumor. Extravasated blood corpuscles were present in small areas, here and there, and in some places, extra cellular deposits of granular pigment, probably of haemorrhagic origin. The softer, posterior, deepseated portion of the mass in the orbit was of a dull, red color, very friable and almost pulpy in consistence.

Portions of this treated in the same manner as the preceding were seen to consist almost entirely of small round cells, interspersed with numerous extravasations of blood. In some places

blood corpuscles and tumor cells were found mingled in almost equal proportion. The cells contained very large nuclei. Possibly many of them were free nuclei, at least they had that appearance. In a few places, similar small round cells were charged with brown pigment granules, but as this always occurred at or in the vicinity of blood extravasation, and in association with considerable quantities of free pigment, there is some doubt as to origin in the cells containing it. Certainly neither the quantity nor the distribution of this pigment would warrant our calling this portion of the growth melanotic.

The stroma consisted of a finely granular, slightly fibrillated material. Blood-vessels, as such, were not discoverable, but in certain small areas there existed an arrangement of embryonic looking tissue which probably belonged to the vascular system. Here and there were channels of various widths enclosing quantities of blood corpuscles, but without definite walls, unless the gradual transition of round to elongated tumor cells, with their long axis parallel to the channel, could be considered as constituting the vessel wall.

It appears from the foregoing that we had to deal with a mixed growth, the first encapsuled portion being distinctly fibrous in character, and perhaps best designated as a melanotic fibro-sarcoma, whilst the softer, deep-seated growth was evidently a round-celled sarcoma.

In both we are confronted with a wide deviation from the wellknown propensities of these growths.

Assuming, as I think we may, that the primary lesion was a pigmented choroidal sarcoma, the date of its recurrence in the orbit after removal of the eye may fairly be placed at the period when the persistent orbital and neuralgic pains returned, that is within a year or two after the eye was removed, inasmuch as the patient was entirely free from pain for a year or two after the first operation, but since they returned has never enjoyed more than a few days relief at a time.

So long as the growth had not extended beyond the limits of the encapsuled portion its presence would certainly not have been revealed to the patient, or to an unskilled observer, since it had not attained a sufficiently large size to encroach visibly upon

the surrounding parts and alter their appearance; and in view of its fibrous character it may very well have been growing slowly for years. The tendency to slow or comparatively slow growth in the more fibrous melanotic tumors is, I believe, generally admitted, but I have not been able to find any case on record *that so strongly emphasizes the principle or law as this one does.*

Then again, the round-celled, deep-seated growth can hardly have originated later than four years ago, when the orbit was found to have become nearly filled up. The sudden enlargement and inflammatory attack of two years ago may have been due to a haemorrhage into its substance, and the obvious tendency to extravasate discovered by the microscope renders this assumption highly probable; nevertheless the inflammatory attack might reasonably have been expected to excite or increase the tendency to rapid growth which round-celled sarcomata are well known to possess; this, however, clearly did not occur, and in spite of the apparently favorable conditions for rapid development, the case preserved its original torpid character to the end, and it is to be hoped the anticipated recurrence will follow in the same line.

I have been unable to arrive at any satisfactory explanation of the pains becoming here so conspicuous a symptom throughout the past ten years, for however easily we may understand the pains which existed for years before enucleation of the diseased eye, there was certainly nothing in the nature, size or position of the orbital recurrence, that should have rendered it the source of great or persistent pain, but the freedom from pain since its removal indicates the one as the cause of the other.

TRANSLATION.

In an article on experimental researches concerning the tuberculosis of the cornea in the *Archives d'Ophtalmologie* Panas and Vassaux give the following very interesting experiences:

* * * The course of this malady is divided into a certain number of periods. Indeed, between the inoculation and first appearance of the lesions a certain period elapses, during which the cornea retains its normal appearance. This is the period of incubation.

The tubercle once formed develops and becomes enlarged. This is the second period, or the period of evolution, which stops at the moment when the epithelium, which covers the tubercle, is shed. Then begins the period of ulceration.

It is an important fact that this tubercle having arrived at the height of evolution is reproduced by surrounding itself with young colonies which do not hesitate to unite with the primary source, to ulcerate and to assist in enlarging the loss of substance. This second period of evolution, therefore, may be divided into the period of evolution proper and into the period of dissemination.

The tubercular products having arrived at the heights of evolution, begin to disintegrate, and are eliminated at the same time as are the tissues in which they have been developed, leaving a loss of substance of variable size and extent. This is the third or period of ulceration.

Under the influence of the nutritive material, furnished by the vessels of the pannus, the ulcer is cleansed; the virulent ulcer is changed into a simple one and heals and cicatrices. Therefore we must admit a fourth period—that of reparation. Finally, according to the extent and depth of the ulcer, healing takes place with more or less loss of substance. According to our observations one cannot assign an exact limit to anyone of these periods.

The period of incubation has varied from eight to ten days.

The ulceration has shown itself from the eighth to the twenty-second day and reparation has followed from the twelfth to the forty-fourth day after the first appearance of a tubercle. Indeed, one can understand that the duration of the periods of evolution, ulceration and reparation will be subordinate to the virulence and to the number of successive generations of tubercles.

The progress of the disease, furthermore, is not always the same; the ulceration can assume a serpiginous or phagedenic character, and destroy nearly the whole of the cornea and even perforate it. This has been the case with our fourth rabbit.

In certain cases the process may be an exceptionally benign one. Ulceration then does not take place at all, as was the case with our seventh rabbit. Healing follows without loss of substance only a slight dimness in the cornea remaining. That in these cases the result of the inoculation was not a negative one was proven by the fact that small disseminated tubercular nodules were formed, as in other cases.

The animals remained under observation during a period of from two to eight months. During all this time the rabbits were not kept in the most desirable hygienic surroundings (insufficient aeration, excessive heat, close confinement) and did not die; and at their autopsy, no generalization of the tubercles in the viscera was found. Two of them presented some disseminated tubercles at the base of the lungs. This, however, is not rare, as it is a well known fact that similar tubercular lesions often exist in rabbits in the best of hygienic conditions.

During the course of these experiments only a single animal perished. At the autopsy of this one a general fibrino-purulent inflammation of the pleura, lungs, pericardium and peritoneum was found. (This was due to an error. Dr. Taïamon, who was making some researches in regard to infectious pneumonia had inoculated this animal for his purposes.) In no part of the rest of the body tubercles were found; moreover, one inoculation with these fibrino-purulent products produced panophthalmitis in both eyes of another rabbit, of such rapid a course as to necessitate the sacrifice of the animal

on the fourth day after the inoculation. At the autopsy purulent panophthalmitis and purulent peritonitis with adhesions were found. No tubercles.

The eyes of all these animal were subjected to a histological examination.

This paper, however, deals only with two stages; the one in which the tubercle is in full activity, the other in which the tubercle is on the way of reparation or completely cicatrized. The other stages will be the object of a later analysis. Our chief aim being to study the clinical march of the disease.

In one of these rabbits killed on the sixtieth day after the inoculation, we saw the mode of development and growth.

We were surprised in examining the microscopic sections, to find nearly a complete absence of giant cells as we habitually see them in man. According to our observations the tubercular nodule makes its appearance through the newly formed capillaries; the corneal corpuscles, dividing and subdividing, gradually arrange themselves around the vessels; at the same time their cellular body becomes more brittle and appears like elements undergoing amyloid degeneration. Very soon numerous leucocytes infiltrate this mass of epitheloid cells.

At a more advanced stage the lumen of the vessel is obstructed by a fine granular mass, in the center of which some leucocytes can be distinguished; the endothelial cells of the wall of the capillary disappear; the surrounding epitheloid cells become more and more granular and adjoining them a layer of round cells is found which absorbs carmine energetically.

Later, the lumen of the vessels has disappeared completely and is replaced by a fine granular or some fibrillar mass filled with very fine angular corpuscles having a great affinity for carmine; the surrounding epitheloid cells become indistinct and only the most peripheral layer of round cells remains unaffected.

Although the giant cells are wanting, the bacillus of Koch is constantly found and the more numerous the farther the disease has progressed. All this goes to prove that we have to deal with true tubercles.

The examination of tubercles beginning to cicatrize and at the stage of complete healing reveals results not less interesting.

In the second rabbit on whom we have with preference studied the course of disease, we have seen complete healing to take place, leaving only a whitish and somewhat prominent spot on the cornea.

The entire cornea and even the nodule are again covered by normal epithelium. At the latter place the epithelial elements are interspersed with leucocytes.

The nodule is composed of an agglomeration of round cells, pressing each other, and which invade the corneal tissue proper and the interlamellar spaces. No elements undergoing granular fatty degeneration, nothing recalling the structure of a tubercle, moreover, no bacillus could be found. We can therefore say that we are dealing with a remnant of inflammatory elements about to disappear. From this nodule these same round elements could be followed up sufficiently far, in the interlamellar spaces, but they were found in the most superficial layers of the cornea only and here and there some capillaries gorged with yellowish or brownish granules, composed of haematoidine. The rest of the membrane, Descemet's membrane with its epithelium, the iris and ciliary body were sound.

In the seventh rabbit the lesion healed completely with a cup-shaped loss of substance; the epithelium of the cornea covers the entire concavity of this loss of substance and even presents at this place a thickness nearly double that of the normal layer of epithelial cells; there are also some round cells in the interlamellar spaces; no bacilli. Descemet's membrane and other portions of the eye are normal.

In the third rabbit the cornea was destroyed to a very considerable extent in consequence of the ulcerative process, and in more than two-thirds of its thickness; so that at this place the membrane was only represented by the thin layer of Descemet's membrane, protected by a layer of cicatricial tissue substituting the corneal tissue. All this immense loss of substance was covered again by an anterior and posterior epithelium. No alterations of the deep membrane; no bacilli.

Thus we see that the beginning of this experimental tuberculosis is characterized by the appearance of a milky spot in the tissue of the cornea, accompanied or preceded by scleral injection.

This spot turns rapidly into an abscess and the abscess may have two destinies:

It may be absorbed; healing then follows without any damage to the cornea.

Or, what happens more frequently, it ulcerates and heals with more or less loss of substance, leaving as a trace of its existence, a nebula, macula or leucoma.

The lesions, whatever may be their extent, remain localized exclusively in the cornea. They are propagated to other portions of the eye only under one condition; that is, if there is a perforation of the membrane and the tubercular virus penetrates into the anterior chamber.

The conditions are then as if the iris had been directly inoculated, and it is well known with what rapidity these tubercular lesions are propagated in the uveal tract and other portions of the eye. The third rabbit is an example of this; we have said previously that, at the time of inoculation, in consequence of a rapid movement of the animal, the lance had penetrated into the anterior chamber.

Starting from the idea that suppurative lesions of the cornea, which until recently were thought to be lymphatic or strumous, might well be something else; for instance tubercular, we have made use of the first opportunity which was offered to us, that of an individual presenting an abscess of the deep layers of the cornea, resembling in a great measure, what we had seen experimentally in the rabbit. A small flap containing the abscess was taken from the cornea, then incised and placed immediately into the anterior chamber of a rabbit. The result, although negative, merits to be reported here to make our investigations complete. On the May 15, 1884, a man, aged 54 years of age, of scrofulous habit, anaemic, having had swollen glands in his youth, presented himself at the ophthalmic clinic of the Hotel-Dieu.

There was a small irregular, yellowish deeply situated spot in the left cornea presenting the aspect of the tubercles which we had produced experimentally. Pericorneal injection was somewhat intense, some vessels even advanced into the corneal substance. By means of a Graefe knife this small caseous ab-

cess was detached together with some layers of the cornea and introduced immediately into the anterior chamber of a rabbit. No inflammatory reaction appeared and some days afterwards this fragment had become attached to the iris. Nothing special was produced in the anterior chamber, nor on the iris, and four months later a broad iridectomy including the corneal graft was made.

By the histological examination a complete attachment of the fragment to the iris is verified. In this fragment are found the characteristic structure of the cornea and Bowman's layer with some migrating cells here and there. Every trace of the abscess had disappeared.

Conclusions.—The result of these researches prove, without doubt, that tuberculosis of the cornea, spontaneous as well as experimental, is identical with certain forms of keratitis which are actually strumous or at least taken for such.

As has been done in general surgery it is necessary in the present stage of science to revise this part of the pathology of the cornea and to see if not some abscesses and ulcers of the cornea, of strumous origin, are in reality manifestations of a localized tuberculisation of this membrane.

To decide this question, the argument taken from the non-generalization of the tubercle in the other portions of the eye and in the rest of the organism, will be no longer of value. We have proven in fact, that the inoculation of the tubercle in the cornea may heal, as it does in other tuberculosis, (testicle, articulations, bone, connective tissue and even in the lungs.)

The only thing to do in doubtful cases is to look for the bacillus of Koch, in the pus of corneal abscesses; or what would be still better, to inoculate a sound animal with this product known to be tubercular. (The inoculation is best made in the anterior chamber or in a serous cavity). Taking it for granted that a local tuberculosis can heal, and as we are until now ignorant of cases of the generalisation of such tuberculosis, we have at present no right to propose partial abseision, much less the total removal of the diseased organ to prevent the generalisation of the disease.

Finally, it is a curious fact that even the inoculation with

tubercular material in the interior of the eye of the rabbit only exceptionally gives rise to a general tuberculosis. This fact is totally in opposition to the doctrine which prevails to-day, and according to which we advise the enucleation of the eyeball as soon as the existence of tubercles in the eye is recognized, in order to prevent thus the generalization of the malady in the rest of the organism.

In an excellent paper on the zonule of Zinn, in *Graefe's Archiv f. Ophthalmologie*, Dr. Wilhelm Czermak arrives at the following conclusions:

2. The zonule of Zinn is not a membranous structure, but a very complicated system of fibres. The space which is traversed by these fibres is a part of the posterior chamber and is filled with aqueous humor. The so-called *canalis Petitii* does not exist.

2. The origin of the fibres of the zonule of Zinn lies in the lamina vitrea of the pars ciliaris retinae; not a single fibre takes its origin from the vitreous body. The lamina vitrea does not pass over into the limitans interna retinae, but into the limiting layer of the vitreous body.

3. There are found a number of endothelial and a great many migratory cells, which with their protoplasmatic offsets cling to the fibres of the zonule of Zinn.

4. The fact, named sub. No. 2, explains the way in which Aeby's and all other macroscopical specimens were obtained and why the lamina vitrea of the pars ciliaris retinae, when torn off, was taken to be actually the zonule of Zinn.

The following are some of the conclusions arrived at by Th. Treitel in a paper on hemeralopia and the examination of the light-sense, published in the *Archiv f. Ophthalmologie*:

1. Hemeralopia is not caused by a defect of the light-sense, but by a defect of adaptation. The adaptation has become

slower in those cases of hemeralopia which can be healed, while in imperfectly curable or totally incurable ones this faculty is partially or altogether lost. In consequence of the abnormal adaptation of hemeralopics their senses for space, color and light are reduced in reduced light.

2. The fact, that patients suffering from idiopathic hemeralopia as a rule can see perfectly well in daylight leads to the conclusion that the pathological changes, which produce hemeralopia, do not lie within the nervous part of the visual apparatus; we must arrive at the same conclusion by the fact that we never observe hemeralopia in cases of disease of the conducting nerve-apparatus, and but very seldom in diseases of the retina.

3. It is probable that the pathological process causing hemeralopia lies in the pigment epithelium which secretes the retinal purple. Yet, there may be lack of pigment without hemeralopia as well as normal pigmentation of the epithelium combined with hemeralopia, since the secretory activity of the epithelium is not dependent on the pigment.

4. Since we call the faculty of an eye of differentiating between varying degrees of light the light-sense, we will only be able to detect anomalies of the light-sense by finding out the smallest difference in light, which can be perceived by the examined eye.

5. The (apparent) defects in light-sense, color-sense and space-sense caused by hemeralopia cannot be compared with the (real) defects in function caused by affections of the nervous visual apparatus.

6. To detect the real anomalies of the light-sense, color-sense and space-sense of hemeralopic amblyopics is only possible by strong light, those of amblyopics without hemeralopia may be detected by reduced light. * * *

CORRESPONDENCE.

Dr. A. Alt:

DEAR DOCTOR.—On page 76 of the last issue of your journal you gave a synopsis of my paper read before the recent meeting of the American Medical Association. The subject of the paper was "The Relation of Errors of Refraction to Headache." This not being stated in your report makes it look as though my remarks belonged to Dr. Murrell's paper. I shall be pleased if you have this corrected.

Sincerely yours,

JOHN F. FULTON.

Adolf Alt, M. D.:

DEAR DOCTOR.—Please make the following corrections in my article in the "American Journal of Ophthalmology," No. 3 and 4, page 87, ninth line from the bottom, for abrasion read abscision, and on page 88, fourth line from the bottom, the same correction, and on the same page the ninth line from the top, for affected read effected, also same page, first line change 1866-7 to 1876-7.

Very Respectfully,

H. CULBERTSON, M. D.

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NOTES OF THREE CASES OF PROGRESSIVE ASTIGMATISM.

BY SAMUEL THEOBALD, M. D., BALTIMORE.¹

In astigmatism due to corneal asymmetry of traumatic origin changes in the amount of the optical defect are not infrequently observed. It has been commonly held, however, that in the ordinary form of so-called congenital astigmatism no such change occurs, but that, however markedly the refraction of the eye may change in other respects, the degree of astigmatism remains always the same. The following cases, which doubtless would furnish more conclusive evidence had a mydriatic been used at each examination, show that this rule is, at least, not without exceptions:

CASE I.—Mr. G. P. was 18 years old when I first examined his eyes, in March, 1872. Atropia was used and a high grade of hypermetropia, with astigmatism, was discovered. The following glasses, which corrected the total hypermetropia, as well as the astigmatism, were prescribed:

L. Eye, $+ \frac{1}{9} s \bigcirc + \frac{1}{20} c$, axis 90° .

R. Eye, $+ \frac{1}{9} s \bigcirc + \frac{1}{20} c$, axis 100° .

1. A paper read before the American Ophthalmological Society, July 15, 1885.

With these R. E. had $V = \frac{20}{xx}$; L. E. $V = \frac{20}{Lxx}$; the retina in the left eye probably being defective.

Five years later, in 1877, the patient reported again, saying that his glasses had not of late given him as perfect vision as formerly. With his old glasses V of R. E. was now only $\frac{20}{xxx}$, and the test lines did not appear alike; V of L. E. was about as before. Atropia was not used, but a careful test showed that a $+ \frac{1}{16}$ c was required for each eye, instead of the $+ \frac{1}{20}$ c previously given. This change brought V of R. E. to $\frac{20}{xx}$ again, and improved somewhat that of L. E.

Four years after this, in 1881 (the patient in the mean time having had an attack of syphilitic iritis in his right eye, from which, however, he had made a good recovery), a further increase in the strength of the cylinders to $+ \frac{1}{14}$ was found to be necessary, as well as a change in the L. E. from $+ \frac{1}{9}$ s to $+ \frac{1}{7}$ s. These changes brought up the V of the R. E., which had again declined, to $\frac{20}{xx}$, with test lines all distinct, and that of the L. E. to $\frac{20}{L}$ (?)

After an interval of three years more, V of each eye had again declined enough to cause inconvenience, and a further change of the lens to:

L. E. $+ \frac{1}{7}$ s $\subset \frac{1}{13}$ c, axis 90° .

R. E. $+ \frac{1}{10}$ s $\subset \frac{1}{13}$ c, axis 100° ,

was found to be necessary. During the twelve years which intervened between the first and last examinations, the astigmatism had increased from $\frac{1}{20}$ to $\frac{1}{13}$, a change so great as to be scarcely explicable, except upon the supposition that there had been an increase of the corneal asymmetry.

CASE II—Mr. R. D., æt. 34, has depended upon the sight of his myopic and astigmatic right eye for some years, as extensive pathological changes about the yellow spot in his left eye have reduced its vision almost to nothing. In October, 1869, Dr. Russell Murdoch, whose skill in the determination of errors of refraction stands especially high, examined his eyes (without atropia), and prescribed the following glasses:

L. E. plain glass,

R. E. $- \frac{1}{10}$ s $\subset - \frac{1}{16}$ c, axis 180°

Nine years afterwards, in 1878, Dr. Samuel L. Frank, after

a careful examination, found that the R. E. required $-\frac{1}{7} s \subset -\frac{1}{12} c$, axis 10° ; and four years later, in 1882, he changed this for $-\frac{1}{11} s \subset -\frac{1}{11} c$, axis 180° .

In August, 1884, these glasses were still being worn, but with them there was $V = \frac{20}{xxx}$ (?) only, and the test lines were not seen alike. I found that the R. E. required $-\frac{1}{6} s \subset -\frac{1}{16} c$, to $-\frac{1}{9} c$, axis 175° , which improved V to $\frac{20}{xx}$ (?); but as he was satisfied with the sight which his old glasses gave him, no change was made at the time. In May of the present year (1885), however, he reported again, complaining of recent asthenopia. With the same glasses which he was wearing at his previous visit his V now was only $= \frac{20}{lxxx}$ and one letter of $\frac{20}{l}$. He now preferred $-\frac{1}{11} s \subset -\frac{1}{8} c$, which gave him $V = \frac{20}{xx}$ (?), and made the test lines equal. Thinking it best, however, to paralyze the accommodation before prescribing a glass for him, I ordered a four grain solution of duboisia, and repeated the examination after it had been applied three times, the first application having been made the evening before. The result obtained was the same as I had gotten without the duboisia:

R. E. with $-\frac{1}{11} s \subset -\frac{1}{8} c$, axis 175° , $V = \frac{20}{xx}$ (?) and lines alike with $-\frac{1}{9} c$, however, the result was nearly as good, so that I subsequently prescribed for distant vision $-\frac{1}{6} s \subset -\frac{1}{9} c$, axis 175° . With $-\frac{1}{16} c$, (which I had determined to prescribe in August, 1884), the effect was now so poor that it was no longer to be thought of. Here, then, we have a record extending over nearly sixteen years, during which time an astigmatism of $\frac{1}{16}$ exactly doubled itself, becoming $\frac{1}{8}$.

CASE III—Dr. E., then twenty-five years of age, consulted me in June, 1880, on account of imperfect vision. With each eye he could make out only $\frac{20}{l}$ (?), with some letters of $\frac{20}{xl}$. A careful examination (without atropia, however,) showed simple myopic astigmatism in each eye, and I prescribed for him, to be set in spectacle frames, and worn constantly:

L. E.— $\frac{1}{24} c$, axis 180° .

R. E.— $\frac{1}{30} c$, axis 180° .

With these each eye had $V = \frac{20}{xx}$, and saw the test lines all alike.

In November, 1884, he reported that for some time his glasses had not been as satisfactory as they formerly were, and com-

plained especially of his near vision. I found that he was wearing his glasses much tilted forward, so as to increase the optical value of the cylinders, and with them in this position he was able to make out $\frac{20}{xxx}$ with each eye. With the lenses placed vertically he could only make out $\frac{20}{l}$, and, without glasses, $\frac{20}{cc}$. It was not convenient to use atropia in his case, but a very satisfactory examination without it resulted in glasses for constant wear being prescribed, as follows:

L. E. $+ \frac{1}{36} s \bigcirc - \frac{1}{12} c$, axis 180° .

R. E. $+ \frac{1}{42} s \bigcirc - \frac{1}{14} c$, axis 180° ,

which gave again, for each eye, $V = \frac{20}{xx}$, but the test lines not quite perfect.

In June of the present year, he reported that his new glasses had been very satisfactory, and he desired me to order a duplicate pair for him. I found, however, that with each eye a number stronger cylinder gave a better result, making the lines exactly alike, and the letters more distinct. I, therefore, prescribed,

L. E. $+ \frac{1}{42} s \bigcirc - \frac{1}{11} c$, axis 180° .

R. E. $+ \frac{1}{42} s \bigcirc - \frac{1}{13} c$, axis 180° ,

which gave for the two eyes $V = \frac{20}{xv}$ (?).

It is to be regretted that in each of these cases all the tests were not made with the eyes under the influence of a mydriatic, as the results obtained would then, doubtless, be more likely to carry conviction to the minds of those disposed to be skeptical concerning the progression of astigmatism. My experience leads me to believe, however, that had this been done, the results would not have been materially different. Such cases are, probably, not of frequent occurrence; but, if they happen never so rarely, it is of practical importance that this fact should not escape recognition.

If, as seems probable, the increase of astigmatism is due to an alteration in the curvature of the cornea, we should expect to meet with this phenomenon more frequently in the yielding myopic than in the relatively stable hypermetropic eye.

1. I have the notes of several other cases, less striking than those I have related, and Dr. Russell Murdoch tells me of several which he has met with, in one of which he observed an astigmatism change, during a period of nine years, from $\frac{1}{48}$ to $\frac{1}{24}$.

ON THE PULSATING VARIATION OF INTRA-OCULAR TENSION AS MEASURED BY THE MANOMETER.¹

BY DR. LUCIEN HOWE, BUFFALO, N. Y.

The object of this communication is mainly to call attention to an observation proving that retinal venous pulsation is accompanied by a corresponding variation in intra-ocular tension. As this is measured by means of a special instrument, it will be necessary first to devote a few moments to the consideration of the manometer in general, and especially to the form used in the experiments referred to. It is unnecessary to consider the many variations of this instrument, or the different results obtained by earlier investigators. It is sufficient to say that when this line of study was first pursued by Gruenhagen, Adamuek and others, nearly twenty years ago, the instruments used were exceedingly imperfect. They consisted principally of a single U-shaped tube partly filled with mercury, or some fluid, connected at one extremity by means of a flexible tube to a trocar which entered the anterior chamber of the eye. These were evidently imperfect for the reason that as soon as the connection between the instrument and the eye was made, the pressure within the eye forced a certain amount of the aqueous humor out through the trocar into the tube, and at once the intra-ocular tension became abnormal. In order to keep it at as near a natural point as possible, it was then necessary to pour into the distal arm of the manometer either mercury or some other substance, which, exerting a pressure there, would force back the aqueous humor into the anterior chamber and thus re-establish at least the natural tension of the globe. Such an appliance was not only inaccurate but evidently difficult to manage, and it is hardly to be wondered that the early experiments in manometry gave very contradictory results. This, however, was

1. Read at the meeting of the American Ophthalmological Society, July 16, 1885.

the principle in general employed, not only by the two investigators mentioned, but by many of those who followed. It is only recently that a modification of the instrument has been made which bids fair to place this class of experiments upon a substantial foundation. The improvement consists principally in making the manometer a double one, and was suggested in an article which appeared in the *Archiv fuer Ophthalmologie*, volume 29, by Dr. Holzke. In his experiments in the Physiological Institute at Erlangen, he was associated with Dr. Ernst Graser, and the latter has also published a digest of their work together, in the *Archiv fuer Experimentelle Pathologie and Pharmakologie* of September, 1883.

The double manometer referred to deserves a little special consideration. It consists, virtually, of two U-shaped tubes, having their adjacent arms united, and at the point of junction communicates with a single upright tube which can be closed with a clamp attached to a piece of rubber tubing. Each lower curve of the entire instrument is filled about half full with mercury, and the part which joins the two, as also the single arm and the tube leading from the manometer to the trocar, is filled with water. The trocar itself, as used by the gentlemen referred to, was of peculiar construction. This I will refer to later. In the detail of filling the instrument considerable care is necessary, to which it is unnecessary to refer at present. I would simply say that it is essential that all air bubbles be excluded, and then, by lifting the trocar above the level of the open tube at the junction of the two adjacent arms, the water of course rises and tends to flow over. If a clamp which tightens with a screw is then adjusted at this point, not only is air prevented from entering the instrument, but also by means of this screw complete control is had upon the pressure exerted on the column of water and mercury combined. It is upon this fact of being able to control the pressure by means of such a screw that the virtue of the instrument depends, for if the trocar is made to enter the anterior chamber of an animal's eye there would be a natural tendency for the aqueous humor to flow out in the direction of the manometer, but this can be easily controlled by means of the screw in the clamp referred to, and to such a de-

gree that the column of mercury, in the arm of the manometer nearest the animal, can be always kept at exactly the same point in the graduated scale placed upon it, for the purpose of reading off the exact position of the mercury. The pressure exerted by the screw upon the column of water and mercury combined is thus shown, not in any change of the position of the column nearest the animal, but is transmitted over to the other side of the manometer, and shows itself in the farthest part of the column of mercury. In other words, in this way it becomes necessary to take out or add to the quantity of mercury, but by changing the pressure exerted by the screw this may be increased or diminished as is desired. So much for the different forms of the manometers and the advantage of the double manometer as compared with the others.

A word should be said concerning the trocar. Graser and Holzke lay considerable stress upon the details of its mechanism. I, at first, obtained one from the instrument maker recommended by them, but found that its disadvantages were very great. It is rather complicated. It consists of a conical needle with an exceedingly small opening on one side which is closed by a piston-like arrangement connected with the trocar. The advantages of this I was unable to find; but, on the contrary, soon discovered that it was exceedingly liable to get out of order and difficult to manipulate. Accordingly I used simply the needle of a hypodermic syringe which had an opening of considerable size on one side but was closed at the point, and at the other extremity was connected with a simple stop-cock, such as is common in every water pipe. This served the purpose much better than the one described. The animals used in the experiments were cats and rabbits, but it soon became evident that cats were much better adapted to the purpose, because of the greater depth of the anterior chamber. It has seemed advisable to enter into the detail in order that the observations concerning the variation of intra-ocular tension may be made more clear, while at the same time I would call attention to the improvements in the instrument and to the simple modification of the trocar just mentioned. It is proper, therefore, to pass now to the consideration of this variation.

I must say at once that the existence of such a pulsating variation of the tension was noticed among the very first who attempted any experiments in this direction. This I have also observed. In addition, however, I wish to call attention to the fact:

First. That this variation of tension is a measure of the retinal venous pulse.

Second. That, as such, it settles the question as to the cause of the venous pulse, and,

Third. That the duration may be varied by varying the external pressure.

In regard to the first point, when this pulsating variation is shown in the manometer it is possible to recognize with the ophthalmoscope a corresponding pulsation in the venous circulation on the anterior of the globe. This is an observation of prime importance in this connection, but more than once have I failed to obtain any view of the interior of the animal's eye with a trocar at the same time in the anterior chamber. The distorted cornea makes it almost impossible to use the ophthalmoscope with any degree of satisfaction. I have several times been successful, however, in obtaining a good view of the vessels of the fundus, at the same time that pulsating variation was being recorded by the manometer, and found that variation of the intra-ocular tension indicated simply the pulsation on the anterior of the globe or the reverse. In other words, if the same conditions exist in the human subject as in the animal, it is safe to assert that pulsation of any kind on the interior of the globe is also accompanied by a variation of the intra-ocular tension—too slight, of course, to be recognized by the touch or any clinical method of measurement. The observation would also seem to be of interest in determining the question as to the cause of the retinal venous pulse and showing the truth of Donders' theory concerning it. His explanation was as follows: When the heart contracts, the small arteries supply an unusual amount of blood to the interior of the globe and momentarily increase the intra-ocular tension, and this also produces a damming back of the blood in them. Immediately, however, the sclera contracts as it were, and forcing the blood out of the overfilled

veins empties the globe to its previous condition. This seemed a rational explanation. But, on the other hand, such good observers as Coccius, Berthold and Jaeger contended against the theory, asserting with truth that there were then no observations to prove it. On the contrary, it seemed to them the sclera was too unresisting to yield to the small amount of blood thus pumped into it.

When Leber wrote his article for Graefe and Saemisch's *Handbuch*, he simply gave the various opinions as to there being any relation between intra-ocular pressure and pulsation, saying: "For the exact determination of the question experiments are yet to be made." It seems to me that the operations referred to tend to settle the validity of Donders' explanation.

Next I would mention a peculiarity in the duration of the pulsation which does not seem to be generally spoken of. When the trocar is made to enter the anterior chamber and the connection between the aqueous humor and the manometer once established, for a few moments the variation in the rise and fall of the mercurial column is very apparent, and if the hand be placed upon the heart of the animal it will be found that the two are synchronous. I was early struck by the fact that this variation in the tension continued but a very short time. At first I supposed that the connection between the trocar and the anterior chamber had by some accident been obstructed, but pressure of the finger on the globe showed that it was open, the actual fact being that the eye had accommodated itself to the circumstances. Moreover, this pulsating variation after having once ceased can be again initiated by pressure of the finger upon the globe. The second time it lasts a shorter time than the first, and the third time is again of still shorter duration. This variation is apparent from the readings of the manometer.

It seemed worth while to call attention to these three facts in connection with manometry and at the same time to mention the apparatus referred to. I may add, however, that the study was begun with the intention rather of measuring the effect of mydriatics and myotics upon the intra-ocular tension. Concerning this, the data are not yet complete. Any reference to the subject would, however, be incomplete without an expression of

thanks to my friend, Professor Zunzt, of Berlin, in whose laboratory these experiments were made, and to whom I am indebted for valuable suggestions concerning them.

THE AMERICAN OPHTHALMOLOGICAL SOCIETY.

The 21st annual meeting of the Society was held at New London, Conn., July 15 and 16, 1885, the sessions being held in the parlor of the Pequot House. The President, Dr. William F. Norris, of Philadelphia, in the chair.

Dr. C. R. Agnew, New York, read the first paper, which was entitled "Operation for the Removal of the Dislocated Crystalline Lens."

The operation for the removal was as follows:

The pupil was dilated with atropia. The patient was then etherized and cocaine was applied. The eye was secured with fixation forceps. A new instrument, resembling a two pronged fork which was termed a bident, was introduced into the vitreous chamber behind the dislocated lens, pressing it forward. The bident transfixed the eye and held the lens in position. Section was then made in the ordinary manner and the lens removed. The eye was dressed with absorbent cotton and a black silk bandage. Antiseptic solutions were used and a four per cent. solution of cocaine was applied twice a day. The eye recovered without any unpleasant symptoms. The ophthalmoscope revealed atrophy of the choroid and retina. The speaker did not claim that all dislocated lenses should be removed, but this instrument facilitated the operation when it was required.

Dr. David Webster, New York, related a case of extraction of a dislocated lens by Dr. C. R. Agnew's bident.

The patient received a blow on the right eye. This was immediately followed by loss of sight. Examination showed that the lens was dislocated. No treatment was recommended at that time. Some months later, pain suddenly appeared in the injured eye. The lens was found to be cataractous and incarcerated in the pupil. Cocaine was applied, but did not relieve the pain. Atropia relieved the pain. Later the lens be-

came loose and was found in the vitreous. The tension was normal. It was decided to remove the lens. The bident was passed back of the lens, pressing it forwards. The incision in the cornea was then made and the lens removed with a spoon. The eye was dressed with absorbent cotton and recovered without complication. V $\frac{2}{6}$ with $+$ $\frac{1}{8}$ s.

With the bident many eyes may be saved if the lens can be brought in sight. There is not danger from injury of the ciliary body.

Dr. H. Knapp thought that in these cases there was not much difficulty in removing the lens which could often be accomplished with the loss of very little vitreous, but the danger came in afterwards from inflammatory complications, and where the sight was lost, he thought it better to at once enucleate the eye and thus lessen the danger of inflammation. He considered the bident, which was exhibited, to be an ingenious instrument. For the last six or eight years he had not introduced an instrument within the globe to facilitate the removal of the lens. This he was able to accomplish by external manipulation.

Dr. Williams, of Cincinnati, considered the instrument an ingenious and useful one, but in the cases reported he agreed with Dr. Knapp that enucleation was the best procedure.

Dr. C. R. Agnew thought that the bident might also be useful in the removal of foreign bodies from the interior of the eye. He did not acquiesce in the view that enucleation was a simple operation. He regarded it as a serious mutilation.

Dr. C. H. Williams, Boston, thought that there was another alternative than those mentioned, and that was evisceration of the eye, the removal of its contents and closure of the anterior opening with sutures. This he had performed a number of times with success. He thought it better than enucleation. It gives a better stump for the artificial eye.

“Extraction of the Lens in its Capsule,” by Dr. B. St. John Roosa, New York.

For the past three years the doctor had been in the habit of removing the lens in its capsule, in a large proportion of cases without iridectomy. The use of cocaine has facilitated the operation. He referred particularly to the method of dislocating

the lens. The section is made, as usual, but large. After puncture and counter-puncture are made, the knife is turned on its back so that it rests on the iris. The knife is then moved up and down two or three times until the lens is seen to move. Then the section is completed and then the lens can usually be removed with no loss of vitreous. The manipulations on the cornea are made with one or twospoons. Sometimes after the operation the iris is rolled under, but in many cases the pupil is circular. The writer has performed the operation between thirty and forty times and is satisfied with his success. If the lens is not dislocated, iridectomy may be performed and the ordinary operation practiced. A paper on the subject is to be found in the transactions of the *New York State Society* and in the *Medical Record* for February, 1885.

Dr. George C. Harlan, Philadelphia, reported "two cases of sub-conjunctival luxation of the lens."

In the first case no operation was recommended, as vision was good. In the second the lens was removed. The doctor thought it well, in those exceptional cases in which vision remains, that the operator should think twice before resorting to removal.

Dr. O. F. Wadsworth, of Boston, reported a case of "dislocation of the lens under Tenon's capsule."

The eye had been injured two weeks before the patient came under observation. There was loss of sight, pain about the eye and irritation of the other eye. The cornea was hazy and there was blood in the anterior chamber. The eye was enucleated, and it was found that the lens was beneath Tenon's capsule, and that it was held in this position by inflammatory tissue.

"Treatment of Purulent Conjunctivitis," by Dr. J. A. Andrews, New York.

The treatment is based upon the belief that the contagious element is the micrococcus variety. He related a case in which he had secured an inoculation of the seventh generation of a pure culture of a gonococcus.

This is the first case successfully inoculated with the gonococcus. He showed an instrument which he had devised to wash out the conjunctival cul de sac. It consisted of an eye speculum with

hollow arms through which fluid may be passed. He had found bichloride of mercury solution (1 to 1,000) serviceable, but apt to irritate. A six per cent. solution of boracic acid was also found efficient. A two per cent. solution of carbolic acid is useful, as it inhibits the movements of the white corpuscles. Irrigation should be maintained for ten minutes in order to remove all secretion. Nitrate of silver solution (2 to 12 per cent.) is then used and an antiseptic dressing is next applied. This consists of vaseline and boracic acid or carbolic acid; but he laid especial stress upon the importance of maintaining irrigation of the conjunctiva by means of the instrument referred to above.

"Abscess of both Frontal Sinuses," by Charles S. Bull, of New York.

The patient had been hit on the forehead fourteen years previously with a piece of wood. This produced a fracture of both nasal bones and deviation of the septum. In seven weeks the wound had closed. Ten years after the accident a swelling was noted at the upper inner angle of the right orbit which could be made to disappear by pressure. There was complete ptosis. An incision was made into the swelling just beneath the orbital margin and a large quantity of pus escaped (two to three ounces). The cavity was washed with a five per cent. solution of carbolic acid. No connection with the superior nasal meatus could be detected, but the bony septum between the two frontal sinuses was absorbed and both sinuses were converted into large cavities. The entire ethmoid bone was an immense cavity, the bony structure being absorbed. A number of osteophytes were removed. A drainage tube was introduced. The patient was discharged six weeks after the operation and recovered completely. The ptosis disappeared and the eye was restored to the normal plane.

Dr. Knapp recommended the substitution of a silver tube for the rubber drainage tube usually employed.

"A case of Melanotic Sarcoma of the Orbit" was reported by Dr. Buller, of Montreal, Canada. (See this Journal, page 118. Nos. 5 and 6.)

"Bony Tumor of Orbit," by Dr. B.E. Fryer, Kansas City, Mo.

The patient, a boy six years of age, came under observation April, 1885. There was swelling of left orbit which included the whole line of the superciliary ridge. It was quite hard. Some time before the boy had been struck by a piece of wood, but it was thought that no splinter had become lodged beneath the skin. It was decided to remove the tumor. This was done, and on examination it proved to be a bony cyst within which was a small piece of wood. This was enclosed in bone on all sides. The edges of the wound were brought together and healing resulted without complication.

Dr. W. H. Carmalt, New Haven, Conn., reported the case of a child of ten years of age from whom he removed a small growth from the upper lid. Six weeks later the growth had returned. An exploratory operation was done and it was found that the growth extended into the orbit and that it was impossible to remove it entirely. It was therefore decided not to complete the operation. The child has since died. The tumor proved to be a rapidly growing sarcoma. He thought that if in young children the tumor appears to be quickly recurrent and not easily isolated, that no operative interference should be attempted.

Dr. Kipp, Newark, thought that in many cases these tumors of the orbit are not primary but secondary, and that the primary tumor may be in such a position as not to attract attention.

Dr. Harlan, Philadelphia, reported several instances of inflammatory exudations in the orbit simulating tumors and illustrating the importance of exercising great care in diagnosis.

Dr. W. S. Dennett, New York, exhibited a new series of test letters.

Dr. Norris, Philadelphia, presented a new sheet of metric test letters, devised by Dr. Oliver of Philadelphia.

Dr. C. R. Agnew, New York, made a brief reference to a case of occasional or simulated blindness in which the vision suddenly returned.

Dr. Theobald described a similar case in which there was sudden blindness. The ophthalmoscope showed no change in the fundus and the pupils acted normally. A favorable prognosis was given and the patient recovered sight in a short time.

Dr. Buller, Canada, thought that these cases could not be properly termed entirely imaginary. He thought there was for the time being a functional loss of power in the nerve. He referred to a case in which there was hysterical blindness and deafness associated with loss of sensation in the skin covering the mastoid region. On one occasion he applied to the anæsthetic surface an iron sufficiently hot to raise a blister. This was done without the patient's knowledge and unexpectedly. But it did not cause her to wince.

Dr. Roosa had been led to believe from his experience that in these cases there is a basis for the blindness in the ocular condition. There is a derangement of sight from some condition and the patient finally imagines that she is blind.

Dr. Harlan, Philadelphia, thought that there were two classes, one in which there is purely deception, perhaps the result of deranged mental condition, and the second in which there is a real temporary suspension of function.

Dr. Risley, Philadelphia, thought that some of these cases might be explained by an enfeebled condition of the circulation in which the heart was unable to force the blood against the normal intra-ocular tension, and the loss of vision thus would result from want of nourishment of the retina.

Other cases of hysterical blindness were described by Dr. Williams of Cincinnati, and Dr. Andrews of New York.

"Some of the Results Obtained in the Compilation of 1000 Cases of Refraction," by Dr. E. E. Holt, Portland, Maine.

The writer had been in the habit of recording all the measurements connected with the prescribing of glasses. As a result he had found in 1000 cases thus recorded the average distance between the centres of the pupils of the human eye to be about 60 m. m. The average of other measurements were given, and the importance of the physician determining and designating them and then seeing that they were carried was dwelt upon.

"Rapidly Progressive Myopia Checked by Section of the External Rectus," by Dr. G. C. Harlan, Philadelphia. The case was that of a boy of sixteen in whom myopia was progressing rapidly. The external rectus was divided seven years ago. The internal rectus was also excised by the use of prisms. Since then there has been no increase of the myopia.

"Three Cases of Progressive Astigmatism," by Samuel Theobald. Baltimore. (See this number, page 133.)

Astigmatism of traumatic origin, he remarked, is observed not infrequently to undergo changes in degree, but it has been commonly held that congenital astigmatism does not alter in degree, though the refraction of the eye as a whole may undergo marked change. The cases which he reported, he thought, proved that there were some exceptions to this rule.

The first case was that of a young man who with a high grade of hypermetropia had an astigmatism of each eye which required for correction, a $+\frac{1}{20}$ c. The case was observed at intervals during a period of twelve years, and during that time the astigmatism increased until finally a $+\frac{1}{13}$ c was needed to correct it.

The second case was one of compound myopic astigmatism in a young man in which there occurred, along with an increase of the myopia, a growth of the astigmatism, during a period of sixteen years from $\frac{1}{16}$ to $\frac{1}{8}$.

In the third case a simple myopic astigmatism in a physician twenty-five years requiring a $\frac{1}{24}$ c in one eye and a $\frac{1}{30}$ c in the other for its correction, changed in five years so that a $\frac{1}{11}$ c and a $\frac{1}{13}$ c respectively, were needed.

The speaker regretted that the examinations had not all been conducted under a mydriatic, as they would then be more apt to carry conviction to the minds of those disposed to be sceptical regarding the progress of astigmatism. He did not believe that the result would have been different. Such cases are not frequent, but it is important that the fact should be recognized. As the increase of astigmatism is probably due to change in the corneal curvature, the phenomenon should be met with more frequently in the yielding myopic than in the relatively stable hypermetropic eye.

AFTERNOON SESSION.

"Hypermetropic Refraction Passing over into Myopic Refraction," by Dr. S. D. Risley, Philadelphia.

The doctor had on previous occasions called attention to five cases of a similar kind, and the object of his paper to-day was

simply to report seven additional cases seen within the past year.

Dr. W. S. Dennett, New York, made a few remarks on the importance of the examination of spectacles. He exhibited a series of drawings showing the effect of different kinds of lenses on straight lines.

He also exhibited an electric light ophthalmoscope, a description of which has been printed in the *New York Medical Record*.

An arrangement for the demonstration of refraction and accommodation was exhibited by Dr. Howe, of Buffalo, N. Y.

This consists of two bands of thin metals bent in such a manner as to represent the outlines of a double convex lens and passing through it are two jointed rods representing the rays of light ordinarily figured as passing through such a lens and joining at its focus. The flexible bands were attached to each other above and below, so that by approaching or separating the sides, they could be made to show less or greater convexity. The rods representing the rays of light were jointed near the centre in such a way that, while the two halves could be placed in such a direction as to show the light as entering parallel to the axis of the lens, the other two portions could be bent to a point to show the convergence of rays at the focus. By alteration in the position of these rods and also in the focus of the bands representing the lens all the different variations of the laws of refraction and the changes in accommodation can be demonstrated to a class of students.

Dr. E. Dyer, Newport, R. I., demonstrated the perimeter which he had described at the last meeting of the society.

“Two Cases of Unilateral Temporal Hemianopia,” by Dr. R. S. Bull, New York.

The first case was that of a man aged 60, first seen in 1884. In 1880 he had received an injury which rendered him unconscious. When he regained consciousness he found that he was blind in the right eye. In 1883 he noticed a central obscuration of vision in the left eye. There was no syphilis, no disease of the heart and no indication of Bright's disease. He had never used alcohol to excess, but smoked and chewed tobacco in large amounts. There was an irregular central scotoma. The media were trans-

parent and the iris normal. Both optic discs were of a dirty white color and in both there was a deep excavation with pulsating veins and in the left eye there was a large retinal haemorrhage. The tension was normal.

The second case occurred in a man aged 60. He had been knocked down by a horse, receiving a depressed fracture of the frontal bone above the left eye. The patient was unconscious or delirious for four weeks following the accident. When he regained consciousness he found that the left eye was blind. Examination showed that in the left eye there was somewhat irregular temporal hemianopia. This may have resulted from fracture of the superior orbital plate, with injury to the fibres of the optic nerve going to the temporal half of the retina.

“Two Cases of Penetration of the Eyeball with Scissors in the Operation of Strabismus,” read by Dr. H. Derby, Boston.

The first case was that of a young man on whom an operation for strabismus had been attempted. The surgeon inadvertently picked up a pair of sharp pointed scissors. The point of the scissors suddenly penetrated the eyeball and a portion of vitreous equal in size to a cherry stone escaped. The operation was abandoned and Dr. Derby was called to see the case. The eye was bandaged and the patient put to bed. Several attacks of inflammation supervened, but the patient was discharged on the forty-first day with $V = \frac{7}{10}$.

In the second case the scissors also entered the sclerotic, but after a somewhat tedious convalescence the wound was found closed on the twenty-first day with vision as good as before the operation.

Dr. Knapp stated that he had done three thousand squint operations and in three cases he had punctured the sclerotic. He however completed the division of the muscle and the patient recovered as readily as from an uncomplicated operation.

Dr. Mittendorf stated that he had been present at a strabismus operation where the sclera was opened. He advised the surgeon to complete the operation. This was done and the wound had healed in four or five days. He thought that in case the accident happened that the division of the muscles, should be completed.

Dr. E. Williams, Cincinnati, reported a case in which he had punctured the eye. The patient recovered without difficulty.

"Strabismus, Its Correction When Excessive and in High Degrees of Amblyopia," by Dr. E. E. Holt, Portland, Me.

The writer had employed advancement of the weakened attenuated muscle in connection with tenotomy, in certain cases of squint, and after tenotomy alone had failed to correct the deviation. He also exhibited an apparatus he had devised for showing the associated and accommodative movements of the eyes and the effects of tenotomy and advancement of the muscle in correcting squint.

Dr. Kipp at one time employed advancement, but he had given it up because it was difficult to graduate the result.

"The Treatment of Strabismus Internus," by Dr. W. W. Seely, Cincinnati.

He said that each year with its added experience had strengthened the conviction that early operations (up to the tenth or fifteenth year) are questionable and possibly should be entirely abandoned. He combated the idea that crossed eyes never become straight without an operation. Nothing is better established than the relation between ametropia and strabismus. And all recognize the necessity for glasses to prevent the recurrence of the squint after tenotomy. Every one knows that it is possible to correct the squint by setting aside the ametropia by means of glasses.

He said, my early conviction that something should be left to time and glasses has long since grown into an absolute law of action, for I have become thoroughly persuaded that immediate perfection meant later in life insufficiency or even divergence.

Operative procedures should not be the first consideration, but should be looked on as an adjuvant to be resorted to later on, if necessary.

He summed up as follows:

1. That with our present light routine operative interference is wrong.

2. That to thoroughly correct the deviation in young children by operative interference is extremely liable to subject them in after life to insufficiency or external squint.

3. That a later period of life if anything favors better results from operative interference.

Dr. Knapp thought advancement a dangerous operation. Had always been able to correct the deviation by two or three tenotomies and if necessary stitching the eye to the commissure.

Dr. Theobald, Baltimore, endorsed Dr. Knapp's view in reference to advancement.

He was surprised at the conclusions of Dr. Seely. Squint operations in his hands had been very satisfactory. If postponed they are likely to prove unsatisfactory on account of the amblyopia which is liable to develop.

Dr. O. F. Wadsworth had studied the subject for a long time and had convinced himself that amblyopia from squint did not occur. The ability of the patient to use the vision which he has does seem to be lost by a continuance of the squint, but it may be recovered by practice. If the examination of vision was carefully made he was certain that it would be found that the vision was not improved after the operation. It however is often difficult to get the full amount of vision which a squint eye possesses.

"Ectropion of Both Lids; Blepharoplasty by the Italian Method," by Dr. R. H. Derby, New York.

The displacement of the lids was the result of cicatricial tissue from a severe and extensive burn of the face. The lids were loosened from these attachments and the new lids formed from flaps raised from the arm. The arm was bound to the head with water-glass plaster and the pedicle was not divided until union had taken place.

Photographs were exhibited showing the appearance of the patient before and after the operation.

Dr. Hasket Derby exhibited a box of trial lenses made by Nachet in which the following features were embodied:

1. The doubling of the prisms.
2. The distinguishing of the cylindrical lenses by coloring the positive setting black and the negative red.
3. The adaptation of the trial frames to receive the glasses without removal from the patient's head.
4. The removal of the handles from the prisms and cylinders.

Plastic Operations Without Pedicles, by Dr. B. Joy Jeffries, Boston.

The object of the paper was to make one or two suggestions which the author had not yet put in practice, but which he was ready to try when opportunity offered. He suggested the use of the prepuce from the circumcision of Jewish children for operation about the eyes. He also suggested that in plastic operations the desired result might be obtained without the use of a flap by employing carbolyzed oil dressing to retard healing, for it is well known that some time after a plastic operation the transplanted tissue has almost entirely disappeared.

EVENING SESSION.

Dr. Harlan, Philadelphia, reported two cases of congenital paresis of the external rectus. Dr. Harlan also exhibited and described Borek's sphero-cylindrical lenses.

"The Removal of a Bit of Steel From the Lens with the Electric Magnet," by Dr J. L. Minor, New York.

M. S. was struck one week before coming under observation by a piece of steel. There was a small scar in the cornea and vision was much reduced. There was clearly a piece of steel in the lens, which the doctor desired to remove at once. After consultation it was thought advisable to await the development of some symptoms. The patient was therefore given atropine and instructed to return if the eye gave any trouble. Some time later the eye became irritable, there was considerable ciliary injection; there was haziness and the tension was increased. Cocaine was employed and iridectomy performed. The shank of a strabismus hook was attached to an electro-magnet thus making it a magnet. The extremity of the hook was then carried into the lens and the piece of steel at once attached itself to it and was removed. Thirteen days later the eye had recovered from the operation. The lens has not been removed.

"Malformation of the Upper Lid," by Dr. H. Derby, New York.

In this case there was a fissure of the upper lid from the angle of which a portion of skin projected in a peculiar manner.

"Removal of Epithelioma of the Eyelid by Application of Benzole and Calomel," by Dr. A. Matthewson, Brooklyn

O. D., laborer, fifty years of age, was seen October 30, 1881, with tumor on right lower lid. This first appeared as a warty growth three years previously. Of late it had been rapidly growing and presented a raw granulation surface. Careful examination by an expert showed it to be undoubted epithelioma. It was treated by frequent dustings of calomel, after brushing the surface with benzole. The tumor entirely disappeared until a few months ago when a granular spot appeared at one edge of the site of the former growth. This disappeared under a renewal of the same treatment.

Lipomatous Ptoxis, by Dr. H. Schell, Philadelphia.

Under this head the speaker reported four cases of ptoxis from excessive accumulation of fat in the upper lid. The condition occurred in young women between the ages of 18 and 25. The deformity was symmetrical, the weight of the lid causing it to cover one-half of the cornea. Excessive fat was removed through a horizontal incision. The smallest amount taken away was thirty-five grains, the largest seventy-one grains. The levator regained power in from one to four weeks. In one case it was necessary to repeat the operation.

Clinical Observations, by Dr. L. Webster Fox, Philadelphia.

CASE I.—Congenital cataract in both eyes successfully operated on in a patient sixty years of age.

M. H., a negro, age 60, presented himself at the Germantown Hospital February 4, 1884. Congenital cataract of both eyes was found. The use of a four grain solution of atropia produced no dilatation of the pupils. There was simply light perception. Shortly afterwards the right lens was removed and the wound rapidly healed. At the end of eight days the patient could see but could not name objects without touching them. The lens of the left eye was also successfully removed. The effect of the acquisition of sight after sixty years blindness was carefully described by the doctor. The lenses when removed were found to be of a spheroidal shape. The optic nerve presented an oval outline.

CASE II.—Recovery of useful vision after eighteen years blindness.

R. L., age 37 years was injured in the left eye when three

years of age. Two years subsequently sympathetic ophthalmia developed in the right eye, resulting in qualitative perception of light only. An iridectomy was done at the Germantown Hospital in June 1884. The media were found to be clear. When admitted to day light complained of erythropsia to such an extent that dark glasses were ordered.

This disappeared in the course of three months. A + 10 D. spherical glass was ordered for distant use and a + 14 rendered near objects visible. Subsequent examination showed that better vision was obtained by a combination of spherical and cylindrical lenses.

Article III. consisted in the history and treatment of five cases of retinitis pigmentosa by electricity (constant current.)

There was marked improvement which in one case remained nine months after discontinuance of the treatment. Five cells are usually employed, the positive pole being placed over the closed eyelid and the negative pole at the nape of the neck.

"On the Pulsating Variations of Intra-Ocular Tension as measured by the Manometer," by Lucien Howe, M.D., Buffalo, New York.

In calling attention to the variations of intra-ocular tension some attention was also given to various forms of manometer or instruments for its measurement. The earlier forms consisted simply in a U-shaped tube of glass connected by a flexible tube to a trocar. When the trocar was introduced into the anterior chamber of the eye the intra-ocular pressure would tend to force the fluid through the tube and show the degree of pressure by a rise in the opposite column of the U-shaped tube. This was imperfect for the reason that when the aqueous humor escaped from the eye, it was at once in an abnormal condition. The double manometer, described by Grassler and Holzke, obviated this difficulty. In this, however, there was an imperfection in the trocar, which was rather complicated and liable to get out of order. An improvement was accordingly suggested in having a stop-cock attached to the needle of the hypodermic syringe, and this the writer found to serve the purpose much better than the other. The animal best adapted to this class of experiments is the cat on account of the deep anterior chamber.

In the earlier experiments with the manometer, it was noticed that the intra-ocular tension varied with the heart's action. In addition to this, the writer called attention to the fact that these variations in the pressure, as indicated by the manometer correspond to pulsations which can be seen with the ophthalmoscope in the vessels in the interior of the animal's eye. In other words, if the same thing holds in the human subject, we must infer that when pulsation is seen in the interior of the eye, there is also a variation of intra-ocular tension, although not enough to be detected by the touch or by an ordinary instrument. This connection between pulsation and pressure is a demonstration of the cause of venous pulse in the eye as explained by Donders. It was also observed that after the introduction of the needle there was at first considerable pulsation, but, after a short time this ceased, the eye evidently adjusting itself to the unusual condition. The experiments referred to were made in the laboratory of Prof. Zunzt, of Berlin.

Dr. H. Knapp, of New York, reported "nine successive cases in which the electro-magnet was used for the extraction of chips of iron from the interior of the eye."

These cases were operated on during the past three and a-half years. In two the chip of iron was located in the iris, in one for two days, causing inflammation, and in the other, for seventeen years, remaining quiet until recently. Both were successfully removed without deterioration of vision.

In the seven remaining cases, the foreign body was in the vitreous, had produced a cataract and could not be seen. In three cases the attempt to extract them with the magnet failed and the eyes had to be enucleated. In four cases the chips of iron were brought forth at the first, second or third introduction of the tip of the magnet. In all these four cases, the recovery was smooth. All four are still cataractous. In two the form, size and tension of the globe is not changed and the perception of light is good over the whole field. In the two others the globe is slightly smaller and softer and the field of vision defective, corresponding to the wound made for the extraction of the foreign body. There was no irritation in any of the four eyes as long as they were under observation.

"The Actual Cautery in Destructive Corneal Processes," by Dr. H. Knapp, New York.

The doctor cited a number of cases in which its use had been of service and considered it a valuable measure.

Dr. Howe had employed this measure in three cases and the corneal ulcer has been somewhat lessened.

Dr. E. Williams, Cincinnati, had, for the past fifteen years, been in the habit of treating phlyctenular ulcers of the cornea by the application of pure carbolic acid and had found it to act admirably.

Dr. O. F. Wadsworth had for several years been in the habit of using carbolic acid for serpiginous ulcers of the cornea and for sluggish, painful infiltrations of the cornea. In sluggish infiltration the application is preceded by scraping, and in some cases the simple scraping has been sufficient. When the *ulcus corneæ* serpens had been severe, he did not recall that it had entirely stopped the process. In one case in which the acid was applied at the beginning of the affection, three applications checked the disease.

THURSDAY MORNING.

"Pneumophthalmos, or Air in the Vitreous Humor," by Dr. W. F. Mittendorf, New York.

The entrance of air into the interior of the eye will occur at times during an operation, as for instance a cataract extraction. In such cases the air may get into the anterior chamber, whence it can be removed with ease. It is, however, entirely different when air gets into the vitreous chamber. Fortunately this accident is of such rare occurrence that so far no description of it has been given. The writer had seen two cases of this kind within the last two years. Both occurred in connection with injuries caused by the entrance of foreign bodies into the interior of the eye. Such accidents are usually so serious that any complication of them becomes a matter of great interest. The first case was that of a young blacksmith who was wounded by a piece of iron penetrating the sclera and lodging in the vitreous humor. The foreign body, surrounded by a clot of blood, was found at the bottom of the eye. Behind the lens, and a

little above it, three air bubbles were seen by means of the ophthalmoscope: one of these appeared to be of the size of a small pea, the smallest was about as large as a grape seed. They closely resembled the air bubble as seen under the microscope, their centres being bright and the outlines well defined and surrounded by a sharp black border. Their recognition was not difficult. The foreign body could not be removed with the magnet and it was decided to allow it to remain. The eye was carefully bandaged, and the day following it was found that the air bubbles had united and thus located at the posterior pole of the lens, the patient having remained quietly on his back some time before the examination. While he was in the upright position the air began to rise slowly until it reached the upper part of the vitreous chamber. During this trip the bubble looked oval and decidedly pointed at its lower portion, resembling oil globules as they are seen ascending in water. Forty-eight hours after the accident, every trace of the air bubbles had disappeared.

The second case reported was the result of a drilling accident. A pretty large piece of stone or iron had perforated the sclera at the lower and outer part of the eye. In the semi-transparent vitreous an air bubble of the size of a hemp seed could be seen distinctly.

In order to determine the exact appearance of air in the vitreous humor, the writer experimented upon rabbits' eyes. Four of them had air introduced into the vitreous humor by means of a hypodermic syringe, and four were subjected to the introduction of oil, also by means of the hypodermic syringe. Nearly all of these experiments were successful. The difference between the air and the oil bubble was so marked that they could be readily diagnosed by means of the ophthalmoscope. The latter were more highly refractive, heavier in appearance and the contour decidedly darker than that of the air bubbles which were entirely colorless.

The conclusions reached by the author were as follows:

1. The entrance of air into the vitreous body can occur only after a part of the contents of the vitreous chamber has escaped.
2. It is favored by the entrance of a foreign body which makes a large gapping irregular wound of the sclera.

3. In order to allow air to enter the vitreous humor, this must either be quite fluid or its anatomical arrangement must have been disturbed by the entrance of a foreign body, or the air must have been attached to the foreign body and be thus carried with it into the eye.

4. The air in the vitreous humor appears like an air bubble as seen under the microscope, it is more or less round, highly refractive in the centre and has a sharply defined black outline.

5. Oil globules in the vitreous present a similar appearance, but they look heavier, are not perfectly colorless and their outlines are darker; they are also more glittering in the centre.

6. Air bubbles will be completely absorbed within two or three days; their presence is not a source of great danger to the eye. Oil globules last longer, but they are likewise non-irritating.

“A Case of Tubercle of the Iris,” by Myles Standish, M. D., Boston.

The patient was a girl, fourteen years of age. Both parents were living and had never presented any evidence of syphilitic or tuberculous disease. Two brothers and one sister, all younger than the patient, are living and well. There is absolutely nothing of a specific character in the history of the patient or her brothers and sister. During the past winter she was confined to bed with intense pain in the epigastrium and ascites. Acute hepatitis was the diagnosis reached by the family physician. No pulmonary lesion was detected.

At the time she came under the observation of the speaker, she complained of feeling run down and was anaemic and poorly developed. The eye trouble had existed for four weeks. There had not been much pain or photophobia.

Examination of the eye, showed the iris attached by its pupillary margin to the capsule of the lens, and somewhat atrophied in appearance. On it there was a growth, 2 m. m. in diameter, pink in color, with small vessels on its surface. The growth projected from the iris near its ciliary border. Various mydriatics were employed without any effect upon the pupil.

In the course of a month the growth had doubled its size, the conjunctiva and iris remaining perfectly quiet. Other

growths made their appearance, and after consultation with Dr. Wadsworth, the eye was removed at the Massachusetts General Hospital.

Examination after enucleation, showed the vitreous, retina and choroid to be normal. The lens was somewhat opaque. The iris was very adherent to the capsule of the lens along its pupillary border, and also beneath the entire area of the principal growth. The largest mass sprang from the surface of the iris near its ciliary border, and at its base was 2.9 m. m. in diameter and was 2 m. m. in height. At the top its diameter was 4 m. m. This was apparently due to the pressure of the growth against the cornea. There were three other growths, but none of them involved the ciliary body, or even the ciliary border of the iris.

The microscopical examination, by Dr. Ernst, showed the presence of giant cells and of the bacillus tuberculosis.

Dr. Knapp had seen growths presenting exactly the same appearance which had disappeared under the use of specific treatment with mercury, even where there was no evidence of syphilis. He had never felt warranted in making the diagnosis of tubercle in such cases, although the presence of the tubercle bacilli in the case would seem to confirm the diagnosis.

"A Case of Congenital Coloboma of the Iris, Choroid, etc.," was reported by Dr. C. J. Kipp, Newark.

The patient was a woman 60 years of age. She was first seen four years ago. There were at that time no inflammatory symptoms, but a small triangular coloboma of the iris was found exactly in the vertical meridian. The tension was above normal. The patient had never seen with this eye, but it had never given pain. Four years later the patient was again seen and the eye presented the signs of inflammatory glaucoma; the pain had prevented sleep for many weeks. The eye was enucleated and healed promptly. There was also found a large ectasia of the sclerotic and over this the choroid and retina were wanting. The ectasia extended close to the optic papilla. There was also a deep kettle-shaped excavation of the optic nerve.

"Coloboma of the Choroid on the temporal side," by Dr. S. D. Risley, Philadelphia.

A young physician consulted Dr. R. for asthenopia. There was a considerable degree of myopia in the left eye. In the right eye vision was much diminished, $\frac{20}{155}$. The ophthalmoscope showed a large hiatus in the choroid on the temporal side, the depth of which was 3 D. There had been no pain. The speaker thought that these cases were comparatively rare.

Dr. Mittendorf had seen several of these excavations in the outward direction. Where the coloboma was so deep it was, he thought, probably a coloboma of the optic nerve-sheath with excavation of the nerve. A difference of 4-D. would indicate a greater defect than would correspond to absence of choroid and retina alone.

"Serous Effusion in the Vitreous, due to Malaria," by W. W. Seely, Cincinnati.

The speaker considered the occurrence of this complication not infrequent, and he reported one case of this affection.

"Gray Degeneration of the Optic Nerve with Abnormal Patellar Reflex," by Wm. F. Norris, M. D.

After an elaborate review of the literature of the subject the speaker gave the result of his observation in cases in which the patella reflex was increased or diminished. He described three cases of gray degeneration associated with tabes dorsalis which had come under his observation. While he did not hold that this symptom indicated beginning tabes dorsalis, yet it was a danger signal calling for rest of the brain and cord with attention to improvement of the general condition.

"A Case of Double Optic Neuritis and Ophthalmoplegia from Lead Poisoning Complicated with Typhoid Fever," by Dr. O. F. Wadsworth, Boston.

A boy of nine years of age had suffered from obscure febrile symptoms for several weeks and movements of the left hand had been observed to be imperfect. When first seen by Dr. Wadsworth there was pronounced optic neuritis in both eyes, the rest of the fundus normal. Vision was much diminished. No lateral movements of left eye could be made and movement downward was impaired. The outward movement of right eye was defective. The probable diagnosis was tumor in the region of the pons.

The movements of the eyes became still more impaired and vision dark. The boy developed distinct symptoms of typhoid fever. The spleen and liver were both enlarged. Lead was found in the urine and the diagnosis of tumor was then abandoned. The treatment was iodide of potassium. The general condition gradually improved. The neuritis passed into atrophy, leaving too little vision to count fingers. The movements of the eyes were completely restored and the lead disappeared from the urine. The cause of the lead poisoning was found to be the presence of a piece of lead pipe in the cistern from which the drinking water was obtained.

“Oil Olive as a Menstrum for Dissolving Cocaine for Application to the Eye,” by Dr. Joseph A. Andrews, New York.

In addition to the occasional benefit from the use of oil dropped into the eye in recent abrasions, burns, and in other painful affections of the cornea in which atropia is indicated, cocaine may likewise be serviceable. The plan of dissolving the cocaine in oil, seems to insure a longer contact of the remedy and a smaller quantity is required to effect anæsthesia two qualities of especial advantage in operations on the eye.

Neither the salt of cocaine nor of atropia is soluble in olive oil, but the alkaloid of both dissolves readily in the menstruum without the addition of an acid, it being only necessary to expose the solution for a few minutes to a gentle heat in a water bath. Castor-oil is not a desirable menstruum on account of its irritating qualities, and the oleate of cocaine for the same reason is still more objectionable as an application to the eye.

“A Case in Which Enucleation of one Eye for Glaucoma Had Precipitated Glaucoma in the Other Eye,” by Dr. David Webster, New York.

The patient was a man of 54, the subject of glaucoma absolutum. He complained of periodical obscuration of vision in the good eye. $V = \frac{2.0}{xV}$ and there was no limitation of the visual field. As he was of dissipated habits he was advised to live properly. A week or two later he returned stating that he had had a worse attack. There was an excavation of the nerve detected in the good eye. The glaucomatous eye was now removed, two days later acute glaucoma appeared. An iridect-

omy was performed and he recovered in a week or two with $V = \frac{20}{XX}$, with no cupping of the disk and no limitation of the field. This was the only case he knew of in which enucleation has precipitated an attack of acute glaucoma in an eye already predisposed to it. He had however reported cases in which iridectomy had produced the same effect.

"Quinine Amaurosis," by Dr. E. Williams, Cincinnati.

The speaker reported two cases. In the first case a man took about one ounce in the course of four days. This produced total blindness and deafness, but in six weeks he could see as well as ever, the hearing had never completely returned although the quinine was taken eight years ago. The field of vision was concentrically contracted in both eyes. The optic discs were very white, the calibre of the arteries and veins was reduced and the smaller capillaries could not be seen.

The second case was that of a boy of 14 who had received large doses of quinine, the exact amount not being known. He was totally blind for four days. When examined the sight was much diminished and the atrophy of the optic disks was extreme and there was great contraction of the field of vision.

"A Means of Measurement of the Amount of Anesthesia From Cocaine," by Lucien Howe, Buffalo.

The doctor exhibited the drawing of a kymograph which he had used for this purpose. The use of the instrument was based on the fact that irritation of a sensory nerve is followed by a rise of blood pressure. The instrument is connected with an artery and the conjunctiva is irritated. Cocaine may then be applied and the results on the blood pressure be compared.

Dr. Harlan, Philadelphia, presented a modified ophthalmoscope which had been devised by Dr. Jackson, of Philadelphia. In it the lenses moved vertically instead of circularly.

Dr. Dennet, New York, exhibited an arrangement for using Stoke's lenses for measuring astigmatism and to avoid the inconvenience of constantly removing the frame from the patient's nose. The lenses were mounted on a stand and could thus be placed in front of the patient.

The society then went into executive session.

The election of officers for the following year resulted as follows:

President, Dr. Wm. F. Norris, Philadelphia.

Vice-President, Dr. Hasket Derby, Boston.

Secretary and Treasurer, Dr. O. F. Wadsworth, Boston.

Corresponding Secretary, Dr. J. C. Prout, Brooklyn.

New members were elected as follows:

Drs. Chas. A. Oliver, Philadelphia; Edward Jackson, Philadelphia; B. Alexander Randall, Philadelphia; D. Pope Walker, New York; William O. Moore, New York; Frank G. Capron, Providence; S. M. Burnett, Washington; Wm. T. Bacon, Hartford.

The next meeting will be held at New London the third Wednesday in July 1886.

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CASES OF GLAUCOMA IN WHICH AN IRIDECTOMY
WAS PERFORMED UPON BOTH EYES AT THE
SAME SITTING.

FROM THE PRACTICE OF C. R. AGNEW, M.D.

REPORTED BY D. WEBSTER, M. D.,

Professor of Ophthalmology in the New York Polyclinic, Surgeon to the
Manhattan Eye and Ear Hospital, etc.

CASE I.—Professor W. Van D., æt. 60, came under observation June 8, 1874. He had been near-sighted in a high degree since his earliest recollection. Thirty years ago, while writing, he experienced a sudden sharp pain through his eyes and temples which compelled him to desist from his work. During the following six months any attempt to use his eyes for near work produced so much pain that he was obliged to stop. For the next seventeen years his eyes were well, and much of the time he overused them. For six or seven years he studied 2 hours before breakfast daily. Thirteen years ago he first noticed a small scotoma before his left eye which never disappeared, but gradually increased in size. Six years ago the sight of the right eye began

to fail, and from that time both failed steadily until four years ago when he was driven to consult a physician. He was informed that his disease was glaucoma and an operation was advised. Two years ago two other physicians severally advised iridectomy, which he declined. One year ago he had seven hypodermic injections of strychnia and four or five applications of galvanism, with no benefit. No history of halos, or of pain "of any account," since the period spoken of, thirty years ago.

Pupils of about normal size and moderately active. Tension of both eyes slightly increased.

Right eye, vision = fingers at 2 feet; visual field entirely obliterated in its nasal portion and greatly contracted above and below.

Left eye, vision = perception of light in supero-temporal portion of field.

Ophthalmoscopic examination: *Right eye*, fundus myopic $\frac{1}{7}$, excavation of optic disk 1.09 mm.; *left eye*, fundus myopic $\frac{1}{7}$, disk excavated 2.14 mm. In both eyes the choroidal pigment is raked up into heaps and the retinal arteries are reduced in size.

Iridectomy upwards upon both eyes, under ether.

July 7. (One month after the operation.) Patient recovered without undue inflammatory reaction.

Right eye, vision = fingers at four feet; visual field unchanged.

Left eye, vision = perception of light.

CASE II.—Doctor J. F., æt. 56, came under observation March 3, 1875. He complained that the sight of his left eye had been failing for a year, the first blur having come on after rather violent exercise. He has had to change his convex glasses for stronger ones several times.

Right eye, $V = \frac{20}{30}$; made $\frac{20}{xx}$ with $+ \frac{1}{40}$; visual field limited in supero-nasal portion.

Left eye, $V = \frac{20}{c}$; not improved with glasses; visual field concentrically limited, very small, but specially on nasal side.

Ophthalmoscopic examination: Excavation of right optic disk 0.46 mm., and of left 0.69 mm. Ring of choroidal atrophy around both disks.

Advised iridectomy upon both eyes.

March 9. After consultation with Drs. D. B. St. John Roosa and H. Knapp, both of whom confirmed the diagnosis, and concurred in the advice already given, Dr. F. was placed under ether and an iridectomy upward performed upon both eyes. No vomiting from the ether.

March 10. Pain in both eyes came on at midnight and lasted two hours. Took two morphine pills, but the pain continued until there was an escape of aqueous humor. A small drop of atropine was dropped into both eyes.

March 11. Pain again last night, but eyes not reddened.

March 12. Severe pain in both eyes, coming on at 2 A. M. and lasting four hours. Both anterior chambers empty, and some chemosis of both eyes.

Right V = counts fingers.

Left V = distinguishes movements of head. Right upper lid slightly swollen. Applied two leeches to each temple. Cold applications. Black draught.

March 14. Wounds healed, aqueous regenerated, pupils widely dilated by atropine; no pain; very little injection.

March 19. R. V. = $\frac{20}{30}$; L. V. = $\frac{20}{100}$. Patient now returned to his home in the interior of the State.

May 14. R. V. = $\frac{20}{30}$ with $+\frac{1}{20}$ c, axis $180^\circ \bigcirc -\frac{1}{60}$ c, axis 90° .

L. V. = $\frac{20}{40}$ with $+\frac{1}{xx}$ c, axis $180^\circ \bigcirc -\frac{1}{60}$ c, axis 90° .

November 10. R. V. = $\frac{20}{xx}$ with $+\frac{1}{30}$ c, axis 180° .

The vision of the left eye is reduced to seeing large objects, and that only in the extreme temporal portion of the field.

June 6, 1876. R. V. = $\frac{20}{xx}$; nasal half of visual field entirely gone. No perception of light in the left eye for the last six months.

Dec. 24, 1881. The vision of the right eye is still $\frac{20}{xx}$, but the visual field is slowly becoming smaller. Sept. 5, 1885. The left eye was recently enucleated for acute glaucoma.

CASE III.—September 3, 1875. Mrs. M. H., æt. 69, has been losing her sight for several years. She could read up to four months ago and can make out some words now. She sees better at night than in day time; cannot distinguish the finer shades

of color; never has seen halos about lights, and has never had pain of any account.

R. V. = $\frac{1}{6} \frac{5}{6}$ } no impt. with glasses.
L. V. = $\frac{2}{16} \frac{0}{6}$ }

Right visual field about 12 inches square and wholly to the temporal side of the fixation point, which it does not reach by two inches.

Left visual field very much smaller than right, includes fixation point, consists of a strip about 12" vertically and 2" horizontally at its widest point, with a narrow prolongation upward and outward 6" long and not more than 1" wide. Pupils of about normal size, but sluggish; iris bulged forward.

Ophthalmoscopic examination: Both disks cupped 0.23 mm., and dark colored; retinal vessels of normal size. No exudations or hemorrhages.

Sept. 6. Iridectomy upward, under ether, upon both eyes at one sitting. No vomiting from the ether. Both cornea and irides were thinner than normal. Patient wears artificial teeth and a wig.

Sept. 7.—Has had no pain or inflammatory reaction. Small drop of atropine in each eye to prevent adhesions.

Sept. 20.—R. V. = $\frac{2}{6}$, L. V. = $\frac{2}{16} \frac{0}{6}$.

Slight conjunctivitis occurred in both eyes during convalescence. Patient allowed to go home with light blue coquilles.

Oct. 18.—R. V. = $\frac{2}{16} \frac{0}{6}$ with + $\frac{1}{4} 2$.

L. V. = $\frac{2}{16} \frac{0}{6}$ with + $\frac{1}{4} 2$.

CASE IV.—August 16, 1876, J. C., aged 46, farmer, states that his mother commenced to lose her sight eleven years ago, became blind within a year, and was operated upon ten years ago at the New York Eye and Ear Infirmary without restoration of vision. She is 69 years old, and never had pain in either eye, but went gradually blind without any other symptom.

J. C.'s vision began to fail in his left eye four years ago, and in his right eye two years ago. His vision, like that of his mother, has failed gradually, without any other symptom.

R. V. = $\frac{2}{16} \frac{0}{6}$, L. V. = $\frac{2}{6} \frac{0}{6}$, no improvement with glasses. Visual fields only slightly and concentrically contracted. Tension increased in both eyes, pupils slightly dilated and sluggish, irides a little bulged forward.

Ophthalmoscopic examination; excavation of disks about 0.46 m.m. each; scleral ring round both disks; arterial pulsation produced by the slightest pressure.

Iridectomy upon both, upwards, under ether.

Aug. 18.—Eyes looking well; no pain; dropped atropine into both, reapplied bandage and allowed patient to sit up.

Aug. 20.—Anterior chambers are regenerated.

Aug. 21.—Shade substituted for bandage.

Aug. 24.—Atropine discontinued.

Aug. 26.—Discharged, both eyes looking well.

Sept. 1.—Returns to-day with a small swelling over insertion of superior rectus of left eye, supposed to be due to a re-opening of the wound and an escape of aqueous into the sub-conjunctival tissues. The imperfect healing of the deeper portions of the wound with a slight increase of intra-ocular tension might give rise to this condition. The swelling disappeared in about a week.

April 14.—The patient presents himself with two clean iridectomies, the left a little broader than the right, and no bulging of the cicatrices. Media clear, tension normal, excavation the same as before operation. Venous pulsation in both, but arterial pulsation not easily produced.

R. V. = $\frac{20}{\infty L}$ with $-\frac{1}{4} c$, axis 90° .

L. V. = $\frac{20}{\infty C}$; no improvement with glasses.

With $+\frac{1}{30}$ reads J. 1 at 9".

The patient runs a saw mill, and, although the tests show that his vision is unchanged, yet he says that he sees better than before the operation.

CASE V.—January 27, 1873, G. R., aged 53, a sailor, has chronic glaucoma of both eyes. R. V. = $\frac{20}{\infty}$; no improvement with glasses; L. V. = counts fingers at 6". Visual fields very small.

Ophthalmoscopic examination. Right optic disk cupped to a depth of 1.80 mm.; left 2.14 mm.

Feb. 12.—Iridectomy upward, upon both eyes, under ether.

Feb. 13.—Had slight pain in eyes last night, but rested well after taking one grain of opium. Right eye slightly red. Atropine dropped into both.

Feb. 19.—R. V. = $\frac{20}{\infty}$.

June 11.—R. V. = $\frac{20}{\infty \times \infty}$, L. V. = Counts fingers at six inches.

CASE VI.—July 13, 1876, W. D. F., aged 49, professor, complains that for the last three months he has had progressive impairment of vision. His sight is cloudy and blurred, but he has had no other symptom.

R. V. = $\frac{20}{\infty \times \infty}$ with $+\frac{1}{48}$.

L. V. = $\frac{20}{\infty}$ with $+\frac{1}{48}$.

Upper halves of both fields nearly gone, and right half of left visual field entirely absent. Tension slightly increased in both. Anterior chambers slightly shallower than normal. Pupils of normal size and not markedly sluggish.

Ophthalmoscopic examination; glaucomatous excavation of disks 0.23 mm. each; steep; veins pulsating at margins of both cups, but no arterial pulsation. Atrophic ring about both papillæ. Iridectomy advised, but patient not prepared for it.

Aug. 8.—No appreciable change in vision or visual fields. Patient decides to defer operation.

April 26, 1877.—R. V. = $\frac{20}{\infty}$ with $+\frac{1}{36}$, L. V. = $\frac{20}{\infty}$; no improvement with glasses. Visual fields much smaller than at previous examinations. Optic disks excavated 0.46 mm. Media clear; arterial pulsation in left eye.

Iridectomy upwards, upon both eyes, under ether. Iris caused to prolapse by pressing on scleral lip of wound so as to avoid introducing forceps into anterior chamber. Slight bleeding into left anterior chamber. Some nausea from the ether, but no vomiting. Charpie and flannel bandage applied.

April 29.—The eyes were opened twenty-four hours after the operation and there was no reaction. Atropine was dropped into both and the bandage was reapplied. The next day slight inflammatory reaction was found in the right eye. Atropine was dropped into both and the bandage was renewed. To-day the patient states that he had a little pain in the right eye last night, for an hour or two, but not enough to cause him to ask for an anodyne. Both eyes perfectly comfortable now.

May 1.—No pain since last date, until last night, when the left eye pained all night, and the right eye pained a little. There is no redness of either eye this morning, and the sight is even better than it was yesterday. No atropine used since last date.

May 4.—When visited last night was found in the hotel office in the full glare of the gas light, and his eyes protected only by medium blue coquilles. This morning was attacked with sharp pain in both eyes which lasted for an hour. Ordered a leech to each temple.

May 5.—Has had no pain since the leeches were applied.

May 7.—No pain since. Comes to the office this morning. R. V. = $\frac{20}{LXX}$ with — $\frac{1}{48}$. L. V. = $\frac{8}{c.c.}$. Right field much larger than before the operation. Allowed to go home to the country. May 23.—R, V. = $\frac{20}{LXX}$ with — $\frac{1}{36}$ c, ex. 90°. L. V. = $\frac{8}{c.c.}$; no improvement with glasses. Both visual fields considerably enlarged.

July 11.—Dr. M. T. Bacon kindly tested the patient and furnished the following notes:

R. V. = $\frac{15}{c.}$; made $\frac{15}{XL}$ with + $\frac{1}{42}$ c, ex. 180°.

L. V. = $\frac{6}{c.c.}$; no improvement with glasses. Right eye, with proper glass, reads J. 1, at 11".

CASE VII.—January 10, 1877, T. R., aged 66, laborer, states that his sight has been failing for eight months. The failure of sight has been going on gradually, without pain. Four days ago he had a temporary obscuration of sight, when everything looked smoky. He has, for some time, noticed rainbows about lights.

R. V. = $\frac{20}{L.}$; visual field 20" horizontally, and 11" vertically.

L. V. = $\frac{20}{c.}$; visual field 11" horizontally, and 9" vertically.

Vision not improved by glasses. Pupils of medium size and lively. Tension of both slightly increased.

Ophthalmoscopic examination: Excavation of optic papillæ 0.46 mm. each, edges not steep, bottoms of excavations bluish gray, atrophic ring about each disk, marked arterial pulsation, left, venous pulsation, right. Advised iridectomy upon both eyes.

April 6.—R. V. = $\frac{20}{L.}$; made $\frac{20}{XXX}$ with + $\frac{1}{60}$ c, ex. 90°

L. V. = $\frac{20}{c.}$; made $\frac{20}{LXX}$ with + $\frac{1}{24}$ c, ex. 90°.

April 25.—R. V. = $\frac{20}{XL}$ —; L. V. = $\frac{20}{c.}$, with best correction by glasses. Arterial pulsation in both.

April 30.—Right visual field 16" horizontally and 14" vertically. Left visual field 2" in either diameter, at 1'. Patient has

had fourteen hypodermics of nirate of strychnia up to physiological effects, without benefit.

Iridectomy upward, upon both eyes, under ether. Slight bleeding into both anterior chambers.

May 1.—Dressing removed. No reaction; no pain.

May 2.—Dropped atropine into both, and substituted shade for bandage.

May 4.—Some reaction in left eye with slight pain.

May 10.—R. V. = $\frac{20}{c}$, L. V. = $\frac{10}{c}$.

June 9.—R. V. = $\frac{20}{xL}$, L. V. = $\frac{20}{c}$.

June 18.—R. V. = $\frac{20}{xL}$, L. V. = $\frac{20}{c}$.

Right visual field 13" vertically and 30" horizontally. Left, 9" vertically and 12" horizontally. Tension normal, and arterial pulsation has disappeared.

CASE VIII.—April 23, 1877. Mrs. J. B., aged 45, three years ago "saw stars" while walking in the street one day. One year ago the eyes failed still more. Has had occasional slight pain, or a feeling of dullness and heaviness, more particularly in the left eye. Has had transient obscurations of sight from time to time. Never has seen halos about lights.

R. V. = counts fingers at 1'.

L. V. = perception of light.

Tension increased, both; left pupil sluggish.

Ophthalmoscopic examination: Media clear; disks cupped; arterial pulsation in right. The right papilla presents the characteristic glaucomatous excavation 0.46 mm. in depth, the general fundus being myopic $\frac{1}{8}$. The fundus of the left is myopic $\frac{1}{4}$ and the papilla is excavated to a depth of 1.80 mm., the excavation being more conical. There is the characteristic atrophic ring about both disks.

April 30.—Iridectomy upwards, upon both eyes, at one sitting, under ether. Just previous to being anaesthetized patient could not count fingers.

May 1.—Had severe pain in left eye at about 10 p. m. No inflammatory reaction in either. Anterior chamber of left is not regenerated and contains a little blood.

May 2.—Removed bandage and substituted shade. Iris of left still close to cornea.

May 4.—Considerable pain in both, but no marked inflammatory reaction. Atropine used once.

(No further notes are found in this case, but the House Surgeon of the Manhattan Eye and Ear Hospital recollected that she left some time after with improved vision).

CASE IX.—Dec. 6, 1877, G. W. S., aged 48, merchant, a year and a half ago was "taken with nervous prostration and dizziness." This passed off in about an hour and he was "taken with heaviness in the pit of his stomach, and trembling." This gradually wore away and in three or four days he was able to attend to business. About a week later he was "taken in the same way" again, and it has "stuck to him" ever since. He was confined to bed about a fortnight, and when well enough to get up, he went to a water-cure, and took hot baths for about five weeks, which, he thinks, did him more harm than good. He then went to Hot Springs, Arkansas, and bathed there for three weeks. While there he "took a violent cold," and a severe diarrhea set in. When they checked it with medicines "it threw the pain into his eyes." He suffered with that pain for two months. His eyes were kept bandaged, and he had to be led about. His eyeballs were red. When the pain "wore off" he could see a little. His doctor told him he must have his *teeth extracted* to relieve his eyes. He had *sixteen* teeth extracted at *one sitting*. All his teeth were extracted at four sittings without any anesthetic. The pain in his eyes has never been so severe since. Every night, as soon as the lights are lit, there is a heavy dull pain in his temples. He cannot see to get about alone at night. He has much pain in the back of his head and neck, and a dull pain along his back bone. He has a numb feeling in his limbs at times. His left eye has had only perception of light for six weeks.

R. V. = $\frac{20}{LXXX}$; visual field concentrically contracted. Tension of both eyes increased, the left more than the right. Pupil of right eye slightly, and of left widely dilated, no mydriatic having been used.

Ophthalmoscopic examination.—Right fundus H $\frac{1}{24}$, excavation of papilla M. $\frac{1}{16}$. Left fundus H. $\frac{1}{24}$, excavation of papilla M. $\frac{1}{12}$. Pulsation of retinal arteries, both.

Dec. 8.—Iridectomy upward, upon both eyes, under ether. Vomiting from the ether, but not violent or prolonged. Both iridectomies were clean and without accident. The eyes were dressed with charpie, flannel bandage and black silk.

Dec. 9.—Right anterior chamber full of blood.

Dec. 10.—Some redness and much photophobia.

Dec. 11.—Right anterior chamber remains full of blood. Pain set in at 3 o'clock and is still persistent, at 9 A. M., though less severe. Iced cloths over both.

Dec. 12, 9 A. M.—Slept well last night. Some smarting and lachrymation of right eye. Subconjunctival ecchymosis over upper half of eyeball. Anterior chamber three-fourths filled with blood. 9 P. M., has felt badly all over since 4 P. M. Has had considerable pain in back of head and neck and an uneasy feeling in eyes. Has had no natural movement from the bowels since the operation, but bowels have been moved daily by enema. Has alternated between diarrhea and constipation for several years, and is afraid to take physic because it always plunges him into a prolonged diarrhea.

Dec. 13. Passed a wretched night. Took half a grain of codeia which failed to relieve the severe pain in his right eye. There is some chemosis. Ordered three leeches to right temple.

Dec. 14, 9 A. M. Passed the night comfortably. Eye less red and less blood in anterior chamber.

Dec. 18. Fresh hemorrhage into anterior chamber with several hours of pain, for each of the last four nights.

Dec. 21. Can see outlines of large objects after he has assumed the erect position long enough for the blood to settle away from the upper part of the pupil.

Dec. 22. Passed a very restless night from nervousness and depression. A cystoid cicatrix begins to show itself at the temporal extremity of the wound in right eye.

Dec. 26. Counts fingers at 8" and sees forms, face, collar and shirt front.

Dec. 29. Anterior chamber is still half full of blood. There is a small deposit of lymph on upper part of anterior capsule.

Jan. 5, 1878. Starts for the South this morning. Sees only

enough to get about his room alone, and to count fingers at one foot. The anterior chamber is still about one-fifth full of blood. Patient feels that he must go South without further delay, as he cannot stand the cold weather.

CASE X.—December 28, 1877. A. M. M., aged 70, a clergyman, first noticed about six months ago a little black spot fitting about before his left eye. Both eyes have become more and more weak ever since, so that now the sight of the left eye is very poor, and he has been unable to read with the best spectacles he has been able to procure for more than a few minutes at a time.

R. V. = $\frac{20}{1.5}$; made $\frac{20}{1}$ with $-\frac{1}{4}$.

L. V. = $\frac{8}{6}$; no improvement with glasses.

Ophthalmoscopic examination: Atrophy of choroid near disk; a large pseudo-staphyloma posticum; cupping and atrophy of papilla, both eyes.

Dec. 29. Saw Dr. Knapp in consultation, who advised iridectomy of both eyes. Tension slightly increased in both. Both visual fields contracted; the left nearly all gone, except the infero-temporal quadrant.

Ophthalmoscope shows right papilla cupped $\frac{1}{4}$ and left $\frac{1}{6}$.

Left shows both venous and arterial pulsation. Both funduses have a mottled look. The choroidal atrophy extends all around each disk and assumes the form of a crescent on the temporal side.

Jan. 10, 1878. Visual fields unchanged.

R. V. = $\frac{20}{1.5}$ with $+\frac{1}{36}$ c, axis 80° .

L. V. = $\frac{5}{6}$; no improvement with glasses. The patient thinks there is more indistinctness than before and his eyes have become more sensitive to light.

Ophthalmoscope shows floating bodies in left vitreous and numerous minute opacities in right lens.

Iridectomy upward upon both eyes without anæsthetic. The aqueous left both with a jet and the iris prolapsed, so that no instrument was introduced into either anterior chamber. There was some bleeding into the right pupil. Conjunctiva friable.

Atropine was dropped into both eyes and they were dressed with charpie, flannel bandage and black silk.

Jan. 11. Has had several attacks of sharp pain, more in the right. Both anterior chambers remain empty. Leave off bandage and use black silk shade.

Jan. 17. Anterior chambers are refilled and eyes are looking well.

Jan. 28. R. V. = $\frac{2^0}{c}$; L. V. = $\frac{2^0}{cc}$.

March 28, 1879. R. V. $\frac{2^0}{XL}$ with $\frac{1}{18}$ c, axis 90° ; L. V. = $\frac{1}{cc}$.

CASE XI.—March 9, 1878. L. S., aged 70, tailor, has noticed for the last year or more an increasing "fog" coming over his eyes.

R. V. = $\frac{2^0}{LXX}$; made $\frac{2^0}{LX}$ with $+\frac{1}{30}$, three-fourths of visual field gone.

L. V. = $\frac{2^0}{LXX}$; no improvement with glasses: one-sixth of visual field remains.

Ophthalmoscopic examination: Peripheral lenticular opacities and glaucomatous cupping of optic disks, both eyes. Right disk cupped $\frac{1}{4}$, left $\frac{1}{2}$. Atrophic ring about both disks and a peculiar stippling of funduses. Tension normal, both; pupils normal, and no bulging forward of irides.

March 11. Iridectomy upward upon both eyes without anæsthetic. Right anterior chamber filled with blood. No atropine used. Eyes bandaged.

March 12. Both anterior chambers re-established, and blood entirely absorbed from the right.

March 22. R. V. = $\frac{2^0}{XXX}$ with $+\frac{1}{36}$ c, axis 90° ; L. V. $\frac{2^0}{c}$; no improvement with glasses.

CASE XII.—August 30, 1876. Mrs. Mary Murphy, aged 50, was sent to me, at the Manhattan Eye and Ear Hospital, by Dr. S. B. St. John. She lost her sight gradually. She first noticed impairment of vision three months ago. Sight has failed very rapidly in the last month. She has suffered much from pain in the back, and has lately had an attack of "rheumatic fever." For the last three or four days she has had a good deal of pain over the eyes. Vision = faint perception of light in only one eye. Pupils dilated and immovable. Media nebulous; retinal veins large, arteries small. Excavation of optic disks. Tension much increased in both eyes.

Iridectomy upwards upon both eyes, under ether, by Dr. Webster.

Aug. 31. Slight pain last night, relieved by atropine and morphine.

Sept. 1. Eyes doing well; bandage left off.

Sept. 5. Some pain and redness of left eye. Relieved by atropine and iced cloths.

Sept. 6. Left hospital. Slight amount of blood in bottom of left anterior chamber. Perception of light about the same as before the operation.

CASE XIII.—June 30, 1874. Mrs. C. S., aged 45, could see well until a year ago, when she had bilious fever which ran into typhoid, during which her eyes became inflamed and painful, and the sight got very bad. They have been very painful repeatedly since. She has been totally blind for the last three months. For the last six weeks there has been no change in her eyes. She is subject to hemorrhoids and has uterine disease.

Both eyeballs are hard, cornea and media so hazy that fundus cannot be seen. The right eye retains faint perception of light, the left none.

July 3. Iridectomy upon both eyes, upward, under ether.

The patient was discharged at the end of the week, with both eyes quiet, but with no increase of vision.

CASE XIV.—December 15, 1884. Mrs. T. W. A., aged 56, five or six years ago had malaria, and began to have "smoky vision" and chromopsiæ. Has had very little pain in her eyes. Patient's mother died, *nine days* before her visit to us, at the age of 81. For three years previous she had been totally blind. An examination made some years ago resulted in ascertainment of the fact that "glaucoma had made extensive progress." She would not have an operation performed. Mrs. A. nursed her mother day and night with the most devoted care, which resulted in considerable nervous prostration.

R. V. = $\frac{20}{L}$; L. V. = $\frac{20}{N.L.}$; no improvement with glasses. Tension increased in both eyes. Both visual fields much reduced, the left to seven inches horizontally by five inches vertically at one foot.

Pupils large and sluggish; broad glaucomatous excavation of both disks, the bottom of each being myopic $\frac{1}{8}$, while the gen-

eral fundus is slightly hypermetropic. Atrophic ring about both disks. Shallow anterior chambers.

Advised to use a solution of eserine, gr. $\frac{1}{2}$ to aquæ 5j; once daily.

Dec. 23. Has used the eserine as directed. R. V. = $\frac{20}{L}$, Hm. $\frac{1}{72}$. L. V. = $\frac{20}{XL}$, E.

Advised to use the eserine every other day.

Jan. 2, 1885. R. V. = $\frac{20}{LX}$ —; L. V. = $\frac{20}{XL}$ +.

Jan. 31. R. V. $\frac{20}{XL}$; L. V. = $\frac{20}{XX}$. There has been less of the fog during the last week than for two months before.

Feb. 28. For three weeks was very much better, but for the last week has had a bilious nervous headache; temples throbbing and some pain in the eyes. Has been subject to such attacks from youth up, and thinks "her stomach has a good deal to do with them." Pupils large. Had eserine in both last night. Tension increased in both.

R. V. = $\frac{20}{XL}$; L. V. = $\frac{20}{XL}$.

March 6. Irideetomy upwards upon both eyes; under ether; Drs. Webster and Ring assisting. Bleeding into left pupil. No vomiting from the ether.

April 9. The patient had an uneventful recovery, with no inflammatory reaction or pain.

R. V. $\frac{20}{L}$; L. V. = $\frac{20}{XXX}$.

May 1. R. V. = $\frac{20}{XL}$; L. V. = $\frac{20}{XXX}$ +.

July 17. R. V. = $\frac{XX}{L}$; L. V. $\frac{20}{XL}$ +.

Visual fields much enlarged, and patient says she uses her eyes much more satisfactorily than before the operation.

CASE XV.—June 22, 1885, A. L. H., aged 66, broker, was referred to Dr. Agnew by Dr. A. E. M. Purdy. He began to wear glasses at this age of forty-five, and never had to give any attention to his eyes previously to that. He had to use stronger and stronger glasses until within the last two or three years, when he has had to change for weaker and weaker ones. For the last year he has been able to read without glasses. His eyes seemed to be all right, otherwise, until two weeks ago, when, one evening, he got very much excited and upset, and, on going out of doors, observed for the first time a kind of shade over the right eye. There was no pain or redness at that time, and

the sight cleared up so that the next morning he "didn't feel any thing of it." Two or three days afterward the same thing occurred, but lighter. He felt very miserable on Wednesday last (this being Monday), and on Thursday night the attack came on the third time with moderate pain "at the outer corner of the eye." The eye looked a little inflamed. He passed a very bad night, suffering severe pain above and below the eye, and running down to the upper teeth of the right side. Friday morning the eye seemed closed, and on opening it, he couldn't see anything but large objects. Has been under treatment since. There is now very little pain. He has no appetite. The right eye is red and the pupil dilated and fixed. The anterior chamber is shallow, the tension increased. The ciliary vessels are engorged, the eye lachrymose and the lids slightly swollen.

While waiting in the office the left eye was for the first time attacked, and, on our seeing him, presented all the appearances of the other, but in a much less marked degree.

R. V. = cannot count fingers.

L. V. = $\frac{20}{XL}$; no improvement with glasses.

Opacity of the media prevents a view of the right fundus. The left cornea is "steamy," but the fundus can be seen, and the disk is not excavated.

2.30 P. M. Iridectomy upwards, upon both eyes, under ether. Drs. Purdy and Webster assisting.

June 30.—Has steadily recovered without any drawback. To go about the house wearing shade and eoquilles, and to go out for a walk in the twilight.

July 1.—Allowed to go "down town" in a coupe for an hour.

July 3.—R. V. = $\frac{20}{XX}$ with $+ \frac{1}{4} \frac{1}{8}$ c, ex, 45° .

L. V. = $\frac{20}{XX}$ with $+ \frac{1}{4} \frac{1}{8}$ c, ex. 180° .

Of the fifteen cases above reported ten were in males and five in females, and their ages ranged from forty-five to seventy. As to their occupations, the five females were married and presumably house keepers, while the ten men represented nine different occupations. In two cases the mother of the patient had become blind from glaucoma, thus furnishing additional evidence to the element of heredity in this disease.

RESULTS.

Thirty eyes were operated upon.

Eleven had the sight improved.

Six had worse vision after the operation.

Thirteen had the vision unchanged.

More particularly:

Two were affected with acute glaucoma, and were the eyes of one patient. The result was, as is usual in such cases, most fortunate. The sight was increased from perception of light in one eye and $\frac{2}{XL}$ in the other to $\frac{2}{XX}$ in both.

Two eyes had glaucoma absolutum, and 5 had chronic glaucoma with only perception of light. The result in these seven eyes was simply to quiet the eye, to relieve the pain and obviate the necessity for enucleation.

Twenty-one eyes with chronic glaucoma had sight before the operation ranging from ability to count fingers at six inches to $\frac{2}{XX}$.

9 of these eyes had the vision improved, in

6 it remained stationary, and in

6 it was worse at the time of the final testing.

One eye became totally blind within six months after the operation, having had $V. = \frac{2}{C}$, with a field of only a few inches in diameter, before, and $V. = \frac{2}{XL}$ about two months after the iridectomy. In some cases the visual fields were considerably enlarged as a result of the operation, while the central vision was slightly lowered.

ON THE APPLICATION OF CYLINDRICAL GLASSES IN SPASMODIC MYOPIC ASTIGMATISM.

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Since using the "Prisoptometer," an instrument of my own device (see "Lancet and Clinic," and "Journal American Medical Association") by which, through the refraction of a prism, the ametropia of the eye is estimated in each meridian singly, I have found, often, that a convex can be made to do the work of a concave cylinder, by placing the axis of the former at right angles to that of the latter. I learn that to correct spasmodic myopic astigmatism of low degree, usually = D. 0.25c to D. 0.5c, the negative cylinder gives the best results for remote vision, while for proximal sight the positive cylinder, axis at right angles to that of the negative glass (each used alone) promotes better near vision and more comfort.

The rationale of this result I believe to be as follows: In our case, in remote vision, there is spasmodic myopia = D. 0.5c in the vertical meridian, in which latter there is too much refraction, and, of course, the focus, in this plane, is in front of the retina. The application of a negative cylinder of D. 0.5c axis 180°, will relieve the anomaly in all the vertical planes, and cast the focus upon the retina, in distant vision. If this negative cylinder, axis 180°, be applied in *near* vision, the power of this glass must be overcome in order to accomplish proximal vision in the *vertical* meridian, at as close a point as is normal for the *horizontal* meridian. This additional force of accommodation in the *vertical* plane will stimulate the fibres of the ciliary muscle in an equal degree, and abnormally, in the horizontal plane, and this preponderation of muscularity will give rise to myopia in the horizontal meridian; while with the same—

an equal degree of force, the focus for the *vertical* rays, will be found upon the retina. But the additional force exerted by the *vertical* muscular fibres will give rise to asthenopia, for the accommodation in the *horizontal* and *vertical* meridians is not harmonious, or equal in degree. Nor will proximity of the object to the cornea, in near vision, remedy the evil, through divergent rays.

The ciliary muscle in the *vertical* meridian, is already enfeebled by over-work, and, hence, not able to do the extra duty imposed, in near vision, by the negative cylinder, axis 90° . Can this be remedied by not using the negative cylinder, axis 180° , and depending upon the divergent rays, in the *vertical* meridian, to bring the focus more posteriorly upon the retina? We think not, because the *vertical* and *horizontal* planes are not harmonious as to their foci. The *vertical* fibres must relax to a certain degree, then take on contraction to an equal extent with those of the horizontal meridian (which is unnatural and an improbable result) to enable mere proximity of the object to the eye to induce harmony of the meridians, and focussing upon the retina in both planes. How, then, shall equality in these meridians be effected? We think it can be accomplished by applying a positive cylinder of the same refracting power as that of the negative cylinder, in our case, with the axis *vertical*, which will add to the power of the ciliary muscle, or the refraction, in the *horizontal* meridian, and advance the focus as far as the point of crossing of the *vertical* myopic rays. So that now both meridians are myopic, and when the object is approached to the eye, the heretofore overtaken *vertical* ciliary-muscle-fibres will have no increased duty imposed upon them; and the fibres of the *horizontal* plane will have less to do, from the presence of the convex cylinder, axis 90° , and the divergent rays will act alike in each meridian, in casting the focus posteriorly upon the retina, in near-vision.

Suppose a case of simple myopic astigmatism = D. 0.5c in the vertical meridian. By — D. 0.5c, axis 180° , V. = D. $\frac{1}{4}$ re-motum; but vision proximum is not perfect with this lens, and if +D. 0.5c, axis 90° (the negative glass having been removed)

be applied, near-vision will become distinct, while the remote sight will not be perfect with this glass.

This subject will be better illustrated by Figs. 2 and 3.

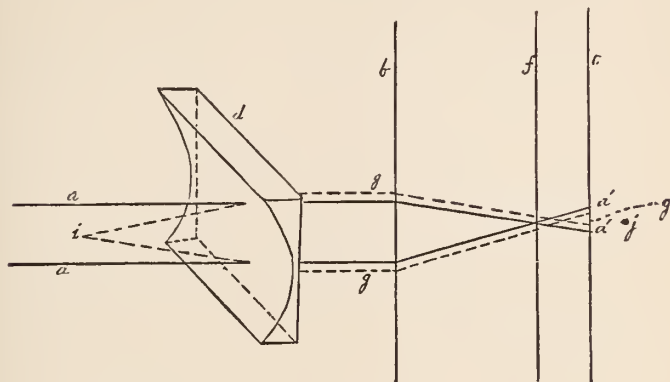


FIG. 2.

In Fig. 2 let a, a' represent parallel rays, but *not* passing through the concave cylinder, d , — $D. 0.5c$, but through an eye myopic in the *vertical* meridian = $D. 0.5c$. This eye is represented in its limits by the lines b, c . The rays are crossed on the line, f , in front of the retina, c , and reach that membrane at $a' a'$. If the — $D. 0.5c$, axis 180° , be applied, the rays of light, a, a' , will be made divergent, as at g, g' , and reach a focus at g' upon the retina, and remote vision will become distinct. If the object be approached to i , the divergent rays, i, g , will have a tendency (without the action of the ciliary muscle) to remove the focus from g' to the more posterior point, j . But by the action of *this* muscle, in its heretofore overworked and enfeebled *vertical* fibres, the focus is prevented from receding and is maintained on the retina at g' . At the same time the *horizontal* muscle-fibres develop less force, as in this plane, in distant vision, the image is at g' , on the retina, hence there should be less work to be done in the *horizontal* plane, when the object is brought to i , in near vision. But from the excessive action of the ciliary muscle in the *vertical*, and an equal degree of force exercised in the *horizontal* fibres in proximal vision, the tendency will be to bring the focus anteriorly upon

the line f , in the *horizontal* rays, to induce artificial myopia, while now the focus is at g' , in the vertical plane, having been prevented by the negative cylinder from receding to j . Thus the foci of these meridians do not correspond, and the question is how shall they be made to, in proximal vision.

Fig. 3 will aid in determining this. The rays a, a , (Fig. 3) in

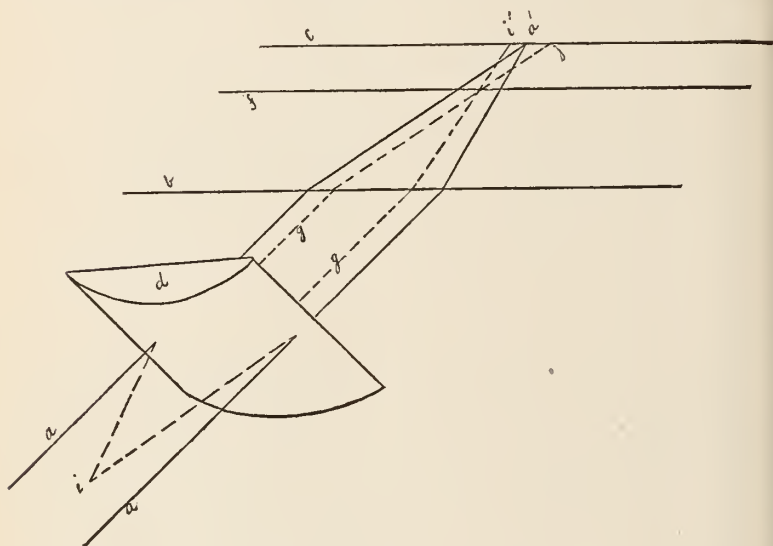


FIG. 3.

the horizontal plane *without* passing through the convex cylinder, $+D. 0.5c$, axis 90° , are brought to a focus at a' , upon the retina, in remote vision. Placing this glass before the eye, in our supposed case, in near vision, the rays diverge from the point i , are refracted by this glass in the *horizontal* plane, to g, g , cross at the line f , and are diffused upon the retina at i, j . Thus this meridian has become myopic as well as the *vertical*. But now the ciliary muscle, being somewhat relieved from duty in the *horizontal* meridian, soon becomes relaxed, the artificial myopia disappears, and the focus falls upon the retina in this plane; while, at the same time through proximity of the object to the eye, the divergent rays are brought to a focus upon the retina in the *vertical* plane as well as in the *horizontal*, the muscular relaxation is equal in the two planes, as well as the reced-

ence of, and the focus is upon the retina in each meridian. The effect of the + cylindric is to relax the ciliary muscle in the *horizontal*, and by sympathy, to diminish the muscularity in the *vertical* meridian. This will relieve the asthenopia.

Several cases are added in illustration of the use of cylinders as detailed above.

CASE I.—W. E. S., aged 26 years, an officer of U. S. Navy. His remote vision in each eye unaided = D. $\frac{4}{4}$ Snellen, with difficulty. His proximal V = D. $\frac{6}{15}$ Snellen. Prismetric vision remotum requires — D. 0.5c, axis 180° in L. E., and — D. 0.25c, axis 180° , and the same glasses are required to see the test types, with which he reads Snellen D $\frac{4}{4}$; remotum with either eye and V₂ = D. $\frac{4}{4}$ Snellen. But in near vision these glasses do not give as distinct sight as +D. 0.5c, axis 90° in the L. E. and +D. 0.25 c, axis 90° in R. E.; with which he reads more easily and with more comfort. Snellen D. $\frac{6}{15}$ cm.

CASE II.—Miss N. S., aged 15 years, a school girl; has vision remotum in each = D $\frac{6}{15}$ S. She reads S. D. $\frac{6}{15}$, with —D. 0.25c, axis 180° in each eye, but with these glasses V proximum = D. $\frac{6}{30}$ S. indistinctly with each eye. Applying + D. 0.25c, axis 90° , each eye, near vision = D. $\frac{6}{8}$ with distinctness and ease; but remote vision is indistinct with these glasses.

CASE III.—Clara B., aged 12 years, a school girl, has V. L. = $\frac{6}{12}$ Snellen. Under duboisine her vision D. = $\frac{6}{6}$ S. After subse-
dence of the influence of the mydriatic, with — D. 0.5c, axis 180° V. L. = $\frac{6}{6}$ S., but near vision is imperfect with this glass. With + D. 0.5c, axis 90° , near = D. $\frac{6}{5}$ and perfect, but distant, vision was imperfect with this glass.

CASE IV.—Miss M. E. C., aged 14 years, a school girl; under duboisine has V. D. $\frac{6}{6}$; remotum, without the mydriatic V = D. $\frac{6}{12}$ S. in the left eye. With —D. 0.5 axis, 130° , V. L. = $\frac{6}{6}$; but with this glass V. L. proximum is indistinct. With + D. 0.5c, axis 65° , near vision = D. $\frac{6}{6}$ + is distinct, but remote vision is indistinct with this glass in the left eye.

These cases were tested with the "Prismometer" as well as with the test types of Snellen.

EXTRACTION OF A FOREIGN BODY FROM THE VITREOUS WITH AN ELECTRO-MAGNET.

BY THOMAS R. POOLEY, M. D., NEW YORK.

The number of cases already reported in which bits of steel and iron have been removed from the vitreous chamber by the use of a magnet are sufficiently numerous. For all this the indications for resorting to this method of procedure rather than the more radical one of enucleation are not well established. It is obvious enough that the mere removal of the foreign body is of but poor profit to the patient, if after its extraction the eye still remains painful, inflamed, the sight is lost, and after weeks or months of suffering and loss of time the eye has to be removed nevertheless. In such cases "the game is not worth the candle." There remains, however, a certain contingent of cases in which the foreign body may be removed without sacrificing the eye-ball, and in which useful vision may be retained. In such cases the operation deserves to be classified as among the most brilliant operations in ophthalmic surgery. We shall, however, only reach correct views about the conditions which render this desirable and possible by a careful clinical analysis of the cases published. It is with the desire to contribute to this end, that I venture to report a recent successful case of extraction of a large chip of iron from the vitreous, although at first sight it seemed as though the only justifiable operation would be enucleation.

February 5, 1885, I was consulted in the dispensary of the New York Ophthalmic and Aural Institute by a man of about 35 years of age, who a few days before was injured while "planing steel" by a piece striking the left eye. But little pain followed the blow; sight was, however, immediately lost. There was only a moderate degree of circum-corneal injection; small con-

tracted pupil, posterior synechia, and corresponding to the latter a wound of the cornea and iris inward with traumatic cataract. Perception of light was good and the visual field intact. There was some slight expression of pain on pressing over the ciliary region. In consultation with Dr. Knapp it was decided to make an attempt to remove the foreign body, which from the direction of the wound, was most likely in the vitreous, by an electro-magnet, and failing to do it, to enucleate the eye-ball. The patient's consent was readily obtained, and the operation at once proceeded with. A meridional incision was made in the sclera with a Beer's knife, between the internal and inferior rectus muscles behind the ciliary region, the point of a Frœlich's electro-magnet was introduced into the vitreous and the foreign body sought for. In the third attempt it was brought into the wound, but could not be extracted. Dr. Knapp then seized it with a pair of forceps and extracted the foreign body, which proved to be a crescentic piece of iron $4\frac{1}{2}$ mm. in length, $1\frac{1}{2}$ mm. in breadth, and weighing 1 grain. The operation, which was not wholly painless, was done under cocaine. The scleral wound was then united by a single point of suture, which was passed through the conjunctiva and episcleral tissue only. Atropine was instilled, a pressure bandage firmly applied over both eyes, and the patient put to bed in a dark room. The next day the eye was doing well. There had been no pain during the night; no discharge, and only slight swelling in the region of the wound was present. The suture had given way, and was, therefore, removed.

February 8. No marked change, but the pupil had dilated, there were no adhesions except where the foreign body entered, and the patient could count fingers at 1'.

February 14. Has had pain during the night lasting until morning; pupil contracted in spite of frequent use of atropine. Eyeball more injected. For several nights until the 23d pain at night continued, which finally grew less under the use of leeches and atropine, when the pupil again dilated and the eye-ball became whiter.

Since then there has been a daily improvement, pupil is wider, though not dilated *ad maximum*; no adhesions except at point

of injury; iris bright. Tn. Eye not at all painful to touch. $V = \frac{1}{cc}$, though the cataract is slowly progressing.

March 9. The eye was slightly more injected, though not painful. This is the last account I have of the patient's condition. He was discharged from the hospital a few days later.

I am indebted for the notes of the progress of his case to the House-Surgeon, Dr. F. E. D'Oench, as owing, to my having resigned from the Institute. I did not have an opportunity to personally observe it myself. From the condition of the patient when he was discharged, it seems that he has a good chance not only of saving the eye, but ultimately of recovering sight also, after the cataract shall have been removed.

The most favorable cases for the extraction from the vitreous chamber of a foreign body are undoubtedly those in which they enter without wounding the anterior part of the eye, especially the lens and ciliary body. Then it is possible often to determine by focal illumination and the ophthalmoscope the fact of the presence of the foreign body and its position, which are important aids to its removal. Moreover, the subsequent healing is more rapid and satisfactory than when the iris, lens, and perhaps ciliary region, are involved. In the case now reported it seems quite likely that a good deal of the reaction which rendered the patient's protracted stay in the hospital necessary, was due to swelling of the injured lens and iritis, rather than to involvement of the ciliary region—in the injury. Any one who has seen the results obtained by the removal of foreign bodies from the vitreous, either with a magnet or by another method, will admit that a large percentage of such eyes are subsequently lost by irido-cyclitis, and phthisis bulbi, the stump remaining sensitive, endangering the other eye for a time and then having to be removed.

I must confess, for my part, that my first impulse in all such cases, as it was in this, is to enucleate, rather than run any danger of sympathetic inflammation. Whether, however, we should always follow first impulses, or listen to sober second thoughts which may suggest a more conservative course is questionable. If the eye can be conserved, and especially if some degree of useful vision can be retained as well, even in as ap-

parently an unfavorable case as the one here recorded, we may well hesitate before we sacrifice so important a member; but we must certainly, too, be alive to the danger which may be encountered by its retention, and see to it that our patient is thoroughly apprised of the exact state of affairs. In regard to the operative procedure it is simple enough. One has, however, to be careful that the wound is sufficiently large to admit of the easy delivery of the foreign body. In my case the shape of the piece of iron, as well as its unusual size, added to the difficulty with which this was accomplished. The probe must, of course, if necessary, be carried in every direction, but it is well to explore the bottom of the chamber first, since all such heavy bodies, unless they penetrate the coats, or become encysted, naturally by gravitation find this position.

In my case I felt and heard distinctly the click of the foreign body against the magnet, the third time I introduced it, and brought the bit of iron successfully into the lips of the wound, from which I could easily enough have extracted it, had not one of the sharp ends always caught in it.

1. Since writing the above I learn that the patient was seen at the dispensary on the 10th of July last. The operated eye then had a normal size, aspect and tension, and was free from irritation.

A CASE IN WHICH THE ENUCLEATION OF AN EYE
FOR GLAUCOMA ABSOLUTUM WAS FOLLOWED
WITHIN THIRTY-SIX HOURS BY AN ATTACK
OF ACUTE GLAUCOMA IN THE FEL-
LOW EYE.¹

BY DAVID WEBSTER, M. D., N. Y.

Thomas B., aged fifty-four, a native of England and a cutter by occupation, came to me at the suggestion of my friend, Dr. Thomas H. Holgate, of New York, on September 23, 1884. He recollected that, upon more than one occasion, in early life, he had received blows, more or less severe, upon his right eye. He was not aware of any impairment of vision, however, until the year 1874, during which he lost the sight of his right eye from successive attacks of what appears, from the history, to have been inflammatory glaucoma. From that time the eye has been sightless and frequently bloodshot and painful.

The left eye had never given him any trouble until within the last few months. Within that period it had been the subject of more or less frequent attacks of cloudiness of vision, but always without pain. A week before he came to see me he had attended a "Society meeting" at Coney Island, had eaten, drank and smoked excessively, and had been greatly alarmed by a consequent obscuration of vision, so extreme that during the evening he "could not discern objects at all." He awoke the next morning, however, with the sight fully restored, and, since that time, had used neither tobacco nor spirits.

Upon examination I found:

Right Eye, pupil dilated and fixed, and giving a greenish re-

1. Read before the American Ophthalmological Society July 16, 1885.

flex, anterior chamber shallow, emergent ciliary vessels enlarged and tortuous, entire ciliary region of a darkish hue as from thinning of the sclera, so much opacity of the dioptric media as to prevent a view of the fundus and the tension much increased (+3). There was also a moderate amount of divergent squint.

Left Eye, vision = $\frac{20}{xv}$, H. m. $\frac{1}{42}$, some central depression of a slightly hyperaemic optic disk, pupil small and quick, tension normal, no limitation of visual field.

As there was, as yet, no permanent impairment of the vision of the left eye, I decided to keep the patient under observation and see how corrected personal habits would influence his eye trouble. I told him to live temperately and come to see me again in a week.

He returned on September 23. Meanwhile, he had experienced two attacks, in the two weeks, similar to that which he had on Coney Island. The last and worst of all he attributed to his having eaten a peach, which caused indigestion. It began at 5:30 P. M., and had not abated when he was put to bed. As before, when he awoke in the morning it was gone and he saw as well as ever. Upon consultation with Dr. C. R. Agnew it was now decided that it would be best to remove the useless and mischievous right eye. Accordingly, with the assistance of Dr. Holgate and Dr. Frank W. Ring, I placed the patient under ether and enucleated the eye on September 29. For thirty-six hours after the operation the patient got along as well as could be expected, but when I visited him on the second morning, the morning of October 1, I found him suffering from an attack of acute glaucoma in his remaining eye. His wife informed me that he had been "vomiting and crazy with pain all night." He was still able to count fingers at five feet. His eyelids were slightly swollen and suffused with tears, his eyeball was red and slightly chemotic, his pupil dilated and fixed, his anterior chamber shallow, and the tension of his eyeball greatly increased.

As I was unprepared to operate I placed the patient upon the use of eserine, one per cent. solution, every two hours and iced cloths constantly. In the afternoon, at 4 o'clock, I found that there had been no further deterioration of vision, and that the

pain, though not entirely relieved, was much less. Dr. Ring again administered ether and I performed an iridectomy upwards.

October 2. No pain since operation; sight much better; no lachrymation; swelling of lids and of conjunctiva unimproved.

October 4. Tells time of day on watch; no pain. Dropped in a drop of a solution of sulphate of atropia, four grains to the ounce, to prevent adhesions.

October 5. Had slight pain last night for a few hours. Lids still somewhat swollen and eyeball quite red. Anterior chamber beginning to be re-established.

October 14. Comes to the office wearing an artificial eye. Vision = $\frac{20}{xx}$; eyeball still a little red.

October 18. Vision $\frac{20}{xx}$; to go to work.

November 17. Vision continues $\frac{20}{xx}$; eye looking well and patient pursuing his occupation without difficulty.

The enucleated eyeball was examined by Dr. E. M. Culver, of New York, who kindly furnished me with the following statement:

"I find some cupping of the optic papilla; not enough, however, I think, to make a positive diagnosis. The lens shows a disarrangement of some of the posterior layers of fibres, and must have been opaque, to some extent, before treated with fluids for hardening. The retina seems everywhere to be separated from the choroid (perhaps by contraction of the celloidin in which it was embedded) and shows, at various intervals, large vessels in an advanced stage of atheroma with very great thickening. These vessels must have been very plainly seen on examination if the lens permitted a view of the interior of the eye.

Certainly the diagnosis of glaucoma absolutum is established, with, perhaps, the addition of some nephritic trouble?"

In the *Medical News*, Vol. XI, No. 8, I published nine cases, most of them operated upon by Dr. C. R. Agnew, in which an iridectomy on one eye seemed to precipitate an attack of acute glaucoma in the other eye. Many other ophthalmic surgeons have observed similar cases, before and since. But the above case is the only one that has fallen under my observation in

which an *enucleation* has produced the same unpleasant result. I believe it to be the first case of the kind ever reported. One of my ophthalmic friends suggested to me that it was a *coincidence*, and that it would have happened at that time, just the same, if the other eye had not been touched. I am inclined to think, however, that this was not the case. It was so similar to so many cases I have seen in which acute glaucoma in one eye followed iridectomy in the other that I am persuaded that the attack was *precipitated*, or brought about before its time by the enucleation. I suppose a sufficiently extensive experience will show us that *any operative interference with one eye of an etherized patient may excite acute glaucoma in the other, provided always that it be strongly predisposed to that disease.*

CORRESPONDENCE.

The following letter was kindly transmitted to us by Dr. H. D. Noyes, of New York.

BERLIN INSTITUTE OF PHYSICS, August 6, 1885.

DEAR DR. NOYES.—If I remember rightly, I told you at our last meeting, which I recollect with great pleasure, that a new edition of the “*Physiologische Optik*” of Prof. Helmholtz was being prepared. At present the work of printing has begun. The bibliography will be printed last and in a separate chapter. It is to be enlarged and to be brought up to the present time. At the request of Prof. Helmholtz I have taken charge of this part of the work. On account of the enormous increase of the literature of physiology during the last twenty-five years, it is very difficult to make it complete. In order to be as thorough as possible, I have published a request asking authors to favor me with a notice of their publications relating to physiological optics. This has appeared in several French and German ophthalmological journals. Would you have the kindness to procure the insertion of a similar call in some of your American journals?

My address, to which letters may be sent, is Dr. Arthur Koenig, No. 16 Neue Wilhelm Strasse, Berlin.

Any communications on the above subject will place me under great obligations.

Most sincerely yours,

ARTHUR KOENIG.

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CONGENITAL COMPLETE PARALYSIS OF THE
OCULO-MOTORS. THE MOVEMENTS OF
THE IRIDES AND THE ACCOM-
MODATION BEING INTACT.¹

BY R. TILLEY, M. D., CHICAGO, ILL.

Complete paralysis of all the branches of both oculo-motors influencing the external movements of the eye in a boy of twelve years of age is certainly not a common affection. Still less common, judging from the literature is the above condition, associated with the normal activity of the irides and the function of the accommodation intact. I refer to the present age of the boy lest any should contend that I have not sufficient grounds for claiming for this case which I present to you a congenital origin. The mother informs me that a few days after his birth it was observed that the upper eyelids were never raised, in other words, that ptosis existed on both sides. She did not seem to be conscious, even about three months ago, of the peculiar condition of the muscles of the eyeballs.

1. Read before the Chicago Medical Society. The patient exhibited September 7, 1885.

Whilst then the assertion of the mother as to the existence of ptosis at this early age is the most direct evidence I have to present, as to a part at least, of the difficulty being of congenital origin, it is reasonable, however, to suppose that with a paralysis of the levators, at this early age, the paralysis of the other branches of the same nerve existed at the same time. Moreover, if any marked change had occurred in the boy's eyes at any time after he began to notice much, the mother would have found it out. She has not observed any such change. That the paralysis cannot be of recent origin is evident from the failure of the recent test which I applied when I first saw the case. On asking him to touch rapidly the tip of a small object like a penholder with his index finger, using one eye at a time, he never failed to strike it exactly. I submit, then, for criticism the question of this being legitimately called a case of congenital origin with such evidence as I have presented.

The question, of course, is here not one of paralysis or paresis of individual branches of one or both of the oculo-motors, but of complete paralysis of all the branches excepting only the irides and the ciliary muscles. In looking up the literature, so far, I have found little satisfaction; so that I am not in a position to form any estimate as to the frequency with which such a difficulty is observed. One tabulated form of the cases of paralysis of the muscles of the eye, as they were observed in Dr. Hermann Cohn's clinic and published by Dr. Paul Schubert (p. 96), I find out of 199 cases of paralysis thirteen are said to have affected all the branches of the oculo-motor, leaving us to suppose that the iritic nerves and those supplying the ciliary muscles were also affected. We are, however, not informed whether both oculo-motors were affected or not. Out of these thirteen, in assigning the various causes, one only is said to have been congenital and in two the cause was unknown.

Alfred Graefe in "*Graefe and Saemisch*," when discussing the question of the paralysis of the oculo-motor and speaking of the immunity of the irides and the ciliary muscles, says: "It is remarkable that sometimes when the oculo-motor is in other respects completely paralyzed, the characteristic mydriasis and paralysis of accommodation is not present." "Possibly."

he adds, "in such cases there exists an anatomical peculiarity, stating as the basis of his supposition that ¹Adamük in dissection found in three out of forty-two cases the new fibres associated with the contraction of the pupil arising from the abducens instead of the oculo-motors.

With these introductory remarks I present to you the patient, a boy of twelve years. Father and mother both living. There has been one other brother who died young. Separation will account for the fact that no other children followed this one. Under the circumstances I cannot get any direct paternal history which would be of interest. Both of the children came quickly after marriage. There was nothing peculiar that I can elicit from the mother in the way of sickness during the patient's childhood, only he was slow in walking. He is certainly not wanting in intelligence. He constitutes one member of a firm for the delivery of papers. In his school he has not done badly, especially when we take into consideration his disadvantage.

His appearance, attitude and gait present a perfect picture of the peculiarities of this affection. You will observe how both lids drop over the eyes, and that any effort to open or close them is effected by the frontalis and the corrugators. I will call attention, however, to a distinct crease which exists now in the external part of the lid, corresponding practically to the upper border of the tarsus. That crease or fold did not exist a month ago. I shall refer to that later. You will notice also that although he can stand with his head erect, in doing so he is not assuming the most advantageous position for the use of his eyes on account of their being turned downward by the action of the superior oblique muscles. To overcome this he directs the head somewhat backwards. He can use either eye at will although he prefers the left, a circumstance which is remarkable as the visual acuity of the right is considerably greater. As I lift the eyelids you will see that neither of them with the head straight serves to show him the way directly in front of him, consequently in walking, if he is using the right eye, he turns his head to the left, so as to bring the field of vision as nearly as possible

1. Vol. VI, p. 56, Graefe und Saemisch.

in front of him, and if he is using his left eye he turns his head to the right. At the same time he combines with the sideward direction a backward direction to overcome the disadvantage of the eyes being turned downwards. All the movements of which his eyes are capable are confined to such as are possible from the antagonism of the external recti and the superior oblique muscles. Movements upwards, inwards and downwards are impossible. On inspecting the eyes you will see that the left deviates more to the left than the right does to the right, consequently when he walks, using his right eye, he turns his head less to the left than he turns his head to the right when he uses his left eye.

The distance to which the eyes deviate is so great that in no part of the visual field does he get double vision; even if such were possible the difference in the visual acuity of the two eyes might prevent the recognition of double images. The deviation you will be able to estimate roughly by the position in which he holds his book when reading with the separate eyes. You will be able to observe for yourselves, as he comes round, that the irides are active, both in the act of accommodation and when under the influence of light.

His vision is far from normal. Dist. V. L. $\frac{6}{c}$; R. $\frac{6}{\overline{XXVT}}$, and neither eye gets any advantage from glasses. For near vision he can read Snellen 0.8 at 6" with either eye. The right does not serve him so well as the left. The left, however, is more divergent. The exact amount of accommodation he possesses I have not estimated. The ophthalmoscopic examination, made about two months ago, revealed nothing abnormal beyond a well defined small black spot on the inner and upper quadrant of the posterior surface of the left lens. I did not attempt to estimate the refraction by the ophthalmoscope.

The color sense is normal, the olfactory organ perfect, taste and hearing excellent. I mention these points to show that their investigation has not been neglected.

As to the etiology of this particular case I am strongly suspicious of the presence of specific trouble on the paternal side. The several points which are not conclusive (but of considerable importance) I prefer not to discuss at the present. The circum-

stances are not propitious for investigation. I wish, however, to advance the historical testimony against my theory. Graefe, in Vol. VI, p. 72 of "Graefe and Saemisch," leads one to infer that he has not observed paralysis as a result of congenital specific trouble, or at any rate, that it is very rare, and states that he does not find it in the books on the special subjects of inherited syphilis in its influence on the eye and ear by Jonathan Hutchinson. As I may be liable to obtain later more direct information bearing on the case, I will leave the question without further discussion at present.

As to the seat of the lesion the matter is of course one of speculation. But the speculation is highly interesting. Its extent and uniformity alone, I think, excludes any conception of its being peripheral in origin. It would be folly to entertain the idea of any obstruction in the orbits. The meninges are the favorite seat of primary specific deposits, but were the meninges the chief source of trouble here we should probably have had other associated difficulties, either of hearing, smell or paralysis of other nerves. If then we exclude the peripheral origin, exclude any obstruction in the orbit, if we do not find sufficient evidence of meningeal trouble, we must seek for the lesions in the cerebral substance somewhere, either at the origin or course of the nerves before leaving the brain substance. Further speculation as to the location in the cerebral substance I leave to others. I will here call attention, however, to one important circumstance which somewhat favors the view that the lesion is in the nerve substance. There is complete absence of the patellar reflex. Now, however guarded we may be in our views of the relation of the patellar reflex to nerve tissue changes, we must admit that they are frequently associated. We also know that paralyzes of the ocular muscles are commonly associated with the development of locomotor ataxia, one of the symptoms of which is the lack of the patellar reflex. He has, however, none of the other symptoms of locomotor ataxia as far as I can elicit. The diminution of visual acuity may also contribute something towards the supposition of the lesion being in the brain substance. Whatever theory we may adopt as to the pathological condition it is difficult to realize with our pres-

ent knowledge, how the fibres supplying the irides, and the ciliary muscles should have so uniformly escaped. It seems necessary to suppose the existence of some anatomical peculiarity, or the development of a vicarious action in the branches coming from the ophthalmic division of the fifth nerve. It will be remembered that the short root from the motor-oculi unites with the long root of the ophthalmic division of the fifth to form the lenticular ganglion. I submit that it is not impossible that this otherwise sensory nerve may under the circumstances associated with a congenital defect take upon itself functions such as would under normal circumstances be performed by the ordinary motor nerve. Or it may be as Graefe suggests, that the abducens has in this case supplied the motor fibres.

My treatment you will in part have anticipated from the view I have taken of the etiology. I will, however, add that in addition to a specific treatment I have been using electricity, not with any great expectation. The difficulty of applying it in the given case to the affected nerves is considerable, nevertheless I am applying it. Further, to leave no available effort untried, on finding there was marked phymosis with considerable elongation of the prepuce I circumcised him, about three weeks ago, in order that if there was any influence associated with reflex action from that source I might remove it. A little circumstance, small as it is, I cannot fail to mention which has occurred since the circumcision. Six days after the operation, when the boy came down to my office I was observing the crease or fold I referred to above in the upper eyelid corresponding to the upper border of the tarsal cartilage, and while I was searching mentally for a means of ascertaining, without putting a leading question as to whether the mother had noticed any peculiarity, she told me, as though anticipating my thought, that the crease or fold in the upper eyelid had developed since the operation.

The prognosis as to relief of the difficulty does not seem promising, but I must say that within the past week my expectation has greatly increased. The movements of the eyes are certainly greater.

A CASE OF SPINDLE-CELL SARCOMA OF THE LACHRYMAL GLAND.

BY ADOLPH ALT, M. D.,

On September 4, 1884, F. Y., æt. 46, was sent to me in consultation by Dr. Frank of this city. He gave the following history:

Had always been a strong, healthy individual, in whom the animal was especially well developed. Some three weeks ago he had an attack of a feverish disease, attended with unconsciousness, which apparently lowered his constitutional vigor very considerably. When becoming conscious he noticed that his left eye was shut, that he was unable to lift the lid voluntarily and that he saw double.

Status præsens. There is a slight ptosis of the left upper lid, which he states is much better than it has been. There is also paralysis of the internal rectus muscle of the left eye. The double images annoy him so that he cannot dare to drive out alone, being afraid to run into somebody. V. of O. D. = $\frac{20}{XX}$; O. S. = $\frac{20}{XX}$. Ophthalmoscopic examination reveals nothing pathological.

As I could detect no other lesion whatsoever, which might have given a clue to the right diagnosis, I could only think of a central lesion. His right patellar reflex seemed increased; his left one diminished.

Syphilis being the most probable cause of such a lesion, I inquired again closely into his history, but I could not elicit anything in this direction. The patient acknowledged an almost superhuman use of his sexual organs, but nothing further; nor knew his family physician of any former syphilitic or even doubtful affection.

The patient was, however, for some time put on anti-syphilitic treatment, but his condition did not change.

I did not see the patient again for some time, but was informed that he had developed symptoms of tuberculosis of the lungs, and had, therefore, been sent to Florida. After some months he returned from there considerably worse.

March 30th, 1885. I saw the patient again in consultation, and found the following conditions:

Continued and almost unbearable pains in and around orbit and upper jaw on left side, (the patient had all his teeth pulled). The left eye now protruded about seven mms. from the orbit in an absolutely straightforward direction. The upper lid, considerably elongated, covered the eyeball, but could not be raised. No possibility to move the eyeball in any direction. Pupils wide ad maximum, immoveable; optic nerve atrophied. It was impossible to feel any tumor behind the eye, but the lachrymal gland could be felt in the upper outer part of the orbit. The whole circumorbital region greatly swollen and œdematous.

These conditions, and especially the straightforward exophthalmus led me now to the diagnosis of a probable tumor of the optic nerve.

Although the general condition of the patient was bad, and a success *quoad vitam* was not to be hoped for, we decided to remove this tumor as a palliative measure, and to free the patient from the enormous pain, if possible.

March 31. The patient being put under the influence of chloroform, I made an incision over the rectus internus and tenotomy of that muscle, with the intention to explore the tumor and eventually to remove it without sacrificing the eyeball. To my astonishment I found it impossible to feel a tumor, but the eyeball seemed to lie firmly in a solid socket. I then proceeded with the enucleation of the eyeball. It became now possible to palpate the tumor which extended almost across the orbit, and had an opening through which the optic nerve had passed forward to the eyeball. It evidently included or had started from the lachrymal gland. There was but little hæmorrhage. After a thorough removal of all pathological tissue, the orbit was dressed with absorbent cotton soaked in a sublimate solution

1:2000. The operation was done with antiseptic precautions, the instruments, sponges and hands of the operator, as well as of the assistants (Drs. Frank, Hunicke, Richter and Luedeking) being soaked and washed in a solution of sublimate 1 to 4000.

In spite of all these precautions a large and very painful abscess formed in the upper lid within the next few days, and led to gangrene of the skin of that lid.

The patient died about two months later from what was undoubtedly a general sarcomatosis.

Specimens taken from different parts of the tumor all showed the same structure, *viz*: round cells, small spindle-cells, and large very closely packed spindle-cells. The round-cells and small spindle-cells are most frequent in the younger portions of the tumor, whilst the larger densely packed spindle-cells evidently form the oldest portion of the growth, and more especially of that part which took the place of the lachrymal gland. There were hardly any blood vessels in the tissue of the tumor and almost no connective tissue. I also have been unable to find any trace of the normal structure of the lachrymal gland.

TRANSLATION.

In connection with Dr. Lucien Howe's article "On The Pulsating Variation of Intra-ocular Tension, etc.," (cf. page 137, No. 7, this JOURNAL) it will be of interest to our readers to get the following report of Dr. Hoeltzke's paper "On Experimental Researches on Intra-ocular Tension," read before the Physiological Society at Berlin, as we find it in the *Centralblatt fuer Praktische Augenheilkunde*.

The statements found in literature regarding the action of eserine, pilocarpine and atropine on the intraocular tension are very incomplete and partially conflicting. Von Hippel and Gruenhagen were unable to find any influence of atropine or calabar-bean extract upon the tension of the anterior chamber; according to Wegner the tension of the eye is considerably reduced; Adamuek also found that the tension was reduced after the instillation of atropia to the extent of two mms. Hg.; Laqueur stated that atropia increases the tension; Pflueger is of the opinion that the tension is reduced by atropia. With regard to the myotic principle of the calabar-bean, it is the opinion of Adamuek that it increases the intra-ocular tension to the extent of three mms. Hg.; according to Pflueger eserine (physostygmmin) increases the tension of the rabbit's eye to the extent of six mms. Hg. Pflueger, moreover, is thus far the only author who has published manometrical experiments concerning the influence of pilocarpine on the intra-ocular tension. He states that the action of this alkaloid is to reduce the tension and, combining the manometrically proved tension-increasing action of the eserine with the clinical experience, that eserine in cases of glaucoma causes a contraction of the pathologically dilated pupil and decrease of tension. he concludes that eserine "primarily" increases the tension of the eye, but that the myosis due to the action of the eserine in such eyes with a pathologically increased tension more than compen-

sates this noxious tension-increasing influence by freeing the exit of the fluids from the anterior chamber in the iris-angle. On the other hand, since pilocarpine, notwithstanding its myotic action, primarily reduces the tension; and secondly, since atropine, although it dilates the pupil, reduces the tension also, in *physiological* conditions, according to Pflueger, the width of the pupil cannot have any influence upon the intra-ocular pressure.

* * * Since we cannot here give the tracings of the curves showing the influence of eserine and atropia of the intra-ocular pressure, we will give a number of results of a series of successful experiments:

Medium maximum under atropia (pupil wide),	-	-	35.2 mms. hg.
.. eserine (pupil differing),	-	-	37.4 ..
.. " (pupil wide),	-	-	42.25 ..
.. " (pupil narrow),	-	-	32.5 ..
.. without instillation (pupil differing),	-	-	34.3 ..
.. " (pupil wide),	-	-	35.0 ..
.. " (pupil narrow),	-	-	33.33 ..

The proportion is very similar between the numbers arrived at with regard to the minimum effects. * * *

* * * The result gained from the curves and these numbers is:

1. Eserine considerably increases the tension of the anterior chamber, but the myosis, caused by eserine, not only compensates this tension-increasing influence, but even reduces the tension of the anterior chamber below the physiological medium.

2. Atropine decidedly lacks a tension-increasing action, but the pressure in the anterior chamber is increased by its dilating influence upon the pupil.

3. In the non-poisoned eye (under physiological conditions), the pressure in the anterior chamber is increased with the dilatation and reduced with the contraction of the pupil.

The fact that the tension of the anterior chamber is reduced when the pupil is contracted, which is now established by the experiment, is of especial interest, since von Helmholtz stated that this tension was reduced during the act of accommodation.

* * *

* * * With regard to the action of pilocarpine the following results were arrived at:

Medium maximum with pilocarpine (pupil narrow nine times, wide once),	- - - - -	28.6
Medium maximum without instillation (pupil narrow five times, wide five times),	- - - - -	27.0
Medium maximum with pilocarpine (pupil narrow nine times, wide once),	- - - - -	21.7
Medium maximum, without instillation (pupil narrow five times, wide five times),	- - - - -	20.3

From these figures and the curves which were obtained, it is evident that pilocarpine also "primarily" increases the tension, although much less than eserine. * * *

All these statements concern the tension within the anterior chamber; but experiments made with regard to the tension in the vitreous body gave constantly the result, that there exist no material differences concerning the pressure in these two cavities.

The degree of the intra-ocular tension is dependent on the blood-pressure. Whatever influences increase the blood-pressure, heighten the intra-ocular tension, too, as for instance, the intoxication by carbonic acid gas, the irritation of the splanchnic nerves, of the vascular center, of the sympathetic nerve, of the sensory nerves, the ligation of large arterial vessels (aorta abdominalis), the ingestion of certain poisons (nicotine). In the same manner a stasis in the venous system will act; especially near the eyeball (ligation of the venæ vorticosæ); moreover, the changes in the blood-pressure due to respiration are transmitted to the eye in such a way that the intra-ocular tension is somewhat increased during expiration. Whatsoever reduces the general blood-pressure also reduces the intra-ocular pressure, viz: Large hæmorrhages, weakness of the heart, cutting the splanchnic nerves, the sympathetic nerve, the cervical medulla, irritation of the depressor nerve, of the central portion of the upper laryngeal nerve, etc.; furthermore, narcotics (chloroform, morphium, chloral and curare), finally death; after the latter has occurred the intra-ocular pressure is usually 8 to 10 mms. Hg.

* * * The only nerve whose influence upon the circulation of the eye and the intra-ocular pressure is known, is the sympathetic nerve. If the cervical portion of this nerve is cut the pupil is

contracted and the intra-ocular tension invariably sinks as much as 6 mms. Hg.; irritation of the peripheral stump causes almost always an increase of the intra-ocular tension amounting to 14 mms. If the faradic irritation be continued for some time, the intra-ocular pressure will become reduced, while the irritation yet lasts, but the increase is never totally lost. By means of irritation with very weak currents, which just only produce a dilatation of the pupil, an increase of intra-ocular pressure may be produced which will remain at the same height for one minute. Irritation of the ganglion supremum gives the same results, but here the currents must be stronger. * * *

All of these statements hold good for both the vitreous body and the anterior chamber. The action of the sympathetic nerve depends on its influence on the circulation of blood in the eye. Compression of both carotid arteries reduces the intra-ocular tension to the very considerable amount of 14 mms. Hg. Irritation of the sympathetic nerve has then no longer any influence. The same may be proven by another experiment. If the contents of the eyeball are by use of the manometer put under a pressure of 100 mms. Hg. and more, the circulation in the orbital vessels remains unaltered, but no blood can get into the eyeball; under these circumstances the irritation of the sympathetic nerve is again unsuccessful, although the pupil is by it dilated, in this case as well as when the carotid arteries have been tied. This proves erroneous the opinion of von Hippel and Gruenhagen, who ascribe to the non-striated muscular fibers of the orbital tissue the tension-increasing influence of the irritation of the sympathetic nerve, and who expect a reduction of the intra-ocular tension due to the contraction of the blood-vessels when the cervical portion is irritated.

The action of the sympathetic nerve upon an eye being under the influence of atropia was also examined into. Cutting the cervical portion generally causes a smaller reduction of the intra-ocular pressure than in the normal eye, sometimes even none at all, although the pupil contracts; but the cutting is never followed by an increase of the intra-ocular pressure. Irritation of the sympathetic nerve causes increase of pressure, as it does in the normal eye; but the increase is not as large as in the normal eye.

During these experiments it was found that an eye being under the influence of atropia, as a rule, showed a lower rate of pressure than one not under the influence of this drug. The action of atropia was, therefore, again made the subject of experiments. Seven technically very successful experiments yielded the following medium maxima:

WITH ATROPIA.	WITHOUT ATROPIA.
Medium maximum, 37.0 mms.	Medium maximum, 40.7 mms.
Pupil wide six times,	Pupil wide three times.
Pupil narrow once.	Pupil narrow four times.

From this results, that the rule, laid down above, viz., that atropia has decidedly no direct tension-increasing action upon the aqueous humor, must be amended in the following manner:

Atropia alone decidedly reduces the intra-ocular pressure, but it increases it by causing a dilatation of the pupil.

Since, as was proven, the sympathetic nerve acts upon the intra-ocular tension by way of the blood-pressure only, namely, by reducing the caliber of the intra-ocular blood-vessels; since, furthermore, eserine also produces constriction of the blood-vessels and increase of intra-ocular pressure, while atropia and section of the sympathetic nerve cause dilatation of the blood-vessels and increase of intra-ocular tension, we are forced to the conclusion that, caused by the constriction of the intra-ocular blood-vessels (within certain limits) and the consequent increase of the intra-vascular pressure, more fluid is transuded into the eyeball. * * *

* * * Finally, the regular combination of an increase of the intra-ocular tension with dilatation of the pupil, and of a decrease with the contraction of the pupil, must thus simply be considered due to changes in the circulation, since mydriasis reduces the circulatory area of the uveal tract, while myosis enlarges it.

An article, published in the *Revue Clinique d'Oculistique*, by Dr. Coppez, "Once More Jequirity," ends with the following conclusions:

* * * "I have no reason to modify the favorable conclusions with regard to jequirity, which I have formulated last

year. I will go further and say that jequirity cures inveterated trachoma with more certainty than an iridectomy glaucoma, Saemisch's operation a serpiginous ulcer of the cornea, Bowman's operation the obstruction of the lachrymal channels.

I uphold the superiority of jequirity above blennorrhœal inoculation in complete pannus. It has all its advantages, without any of its inconveniences and dangers. (?Editor).

I have said that, thanks to Von Wecker, the indefatigable defender of jequirity, the blennorrhœal inoculation, the barbarous remedy, has ceased to live; I repeat it to-day, I even consider it a crime to recur to it at this hour, when as yet, those that do not forget must remember the long nights passed sleepless after some inoculations with a bad result.

Sydenham would rather have given up the practice of medicine than have done without opium. I should prefer to leave my granules in the hand of good Dame Nature, than to give up treating them with jequirity.

CORRESPONDENCE.

Dear Doctor:—In the next issue of the AMERICAN JOURNAL OF OPHTHALMOLOGY will you kindly have the abstract of my paper published as reported by myself in the *Medical News*. I wish to call special attention to the peculiar formula (glass made) which gave my patient $\frac{20}{\infty}$. In the report as published elsewhere everything was out. I will send you a reprint by this day's post.

Very respectfully,

L. WEBSTER FOX, M. D.

The point to which the doctor wishes to have the attention of our readers drawn especially is the following (EDITOR):

Obs. II.—Recovery of vision after eighteen years of blindness. Vision after operation $\frac{5}{6}$ increased by a glass = sph. + 10 D \bigcirc cyl. + 3. D ax. 180 \bigcirc cyl. + 2 D ax. 50° (ground in one) = $\frac{20}{\infty}$. Reading sph. + 14 D \bigcirc cyl. + 1.50 ax. 50° J $\frac{1}{10}$.

EDITORIAL NOTICE.

The editor of this Journal takes great pleasure in announcing to the profession that Messrs. J. H. Chambers & Co. have now in print a *theoretical and practical treatise on astigmatism*, written by the able pen of Dr. Swan M. Burnett, of Washington, D. C.

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ON THE APPLICATION OF CYLINDRICAL GLASSES IN MYOPIC ASTIGMATISM.

BY H. CULBERTSON, M. D., ZANESVILLE, OHIO.

Assistant Surgeon U. S. Army, Retired.

In the August number of the AMERICAN JOURNAL OF OPHTHALMOLOGY, page 181, I published an article on "The Use of Cylindrics in Spasmodic Myopic Astigmatism." *This* paper relates to a form of *non-spasmodic* myopic astigmatism and its correction with glasses.

In the first communication there are several errors, one of which should be noticed. On page 183, August number of this journal, the dotted lines, $g, g, a' a'$, are made in Fig. 2 to cross between the lines $f. c.$, whereas *these* should have been represented as coming to a focus on the line c , at g' not g , or upon the retina. The figures in that will be referred to in this article.

Given a case of axial myopic astigmatism $= D 1.5$ in the vertical meridian, how shall glasses be applied to correct the ametropia in proximal vision? In many instances a $+$ cylinder will correct this, its *axis* placed at right angles to *that* found proper in the correction with the negative cylinder in *vision remotum*. In this case $- D 1.5 c$, axis 180° , gives $V = D \frac{4}{5}$, S. remotum. With this glass, however, vision proximum is not per-

fect, and the asthenopia continues still and due to spasm of accommodation.

In the *vertical* plane refraction is in excess, and when this is diminished by the—D 1.5 c axis 180° , the horizontal and vertical planes are harmonious in vision remotum, but not so in proximal sight with *this* glass.

As the object is approximated to the eye (see i, Fig. 4) in

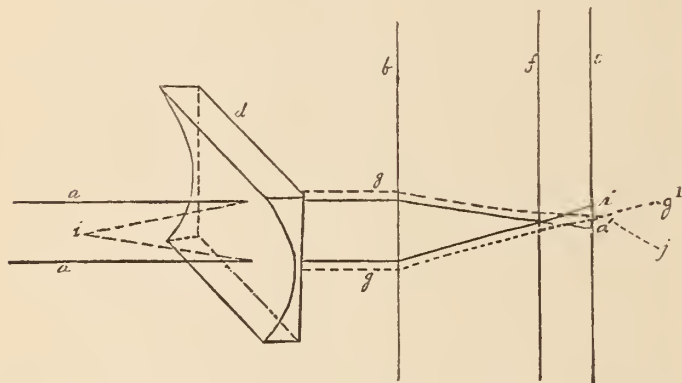


FIG. 4.

near vision, the divergent rays, i, g, g, will tend to focus behind the retina or at j; to overcome this tendency the fibres of the ciliary muscle bearing upon, or which actuate, the vertical planes of the eye must act with increased force=D 1.5, in this case, and greater than the force exercised in the horizontal plane, in order to overcome the presence of *the* negative cylinder, axis 180° , and maintain the focus upon the retina on the line c, Fig. 4. This increased action of the muscle fibres actuating the *vertical* planes will also cause the muscle fibres which act upon the *horizontal* planes to put forth greater power and hence the focus in the *horizontal* meridian will be advanced = D 1.5 and fall upon the line f, Fig. 4 which meridian has now become myopic in near vision, while at the same time the vertical planes have their focus upon the line c, or the retina. By *this*—glass the myopia in proximal vision has been simply transferred from one to the other plane, and the foci of the two planes are not of the same length.

If now the negative eylander be discarded and a $+D\ 1.5$ e axis 90° be applied in proximal vision the rays in the *horizontal* plane will be brought forward to the line f, Fig. 5, *artificial* myopia will be induced in the *horizontal* meridian, the original

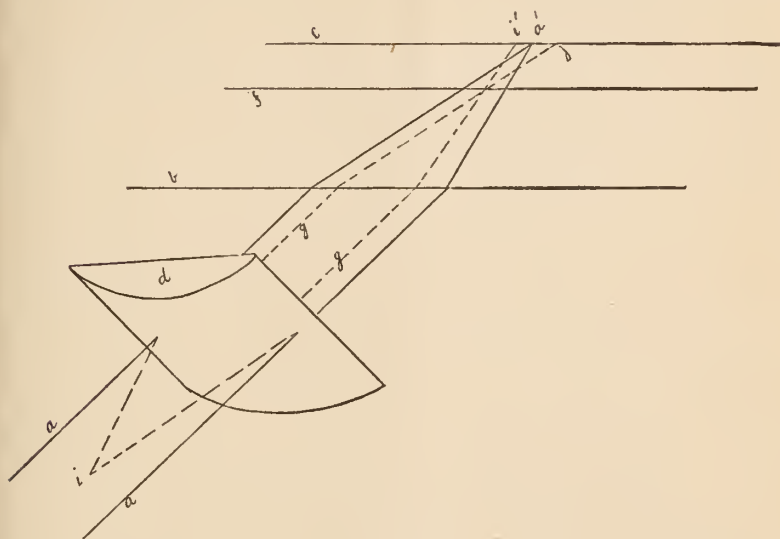


FIG. 5.

myopia in the *vertical* plane will be maintained, and the foei in both meridians will fall upon the line f, Fig. 5. On approach- ing the object to i, Fig. 5, the diverging rays i, g, g' will be cast upon the retina at a', and all the meridians of the eye in near-vision will be perfect and eiliary asthenopia relieved.

A case is added in illustration of the foregoing:

Miss L. H. B., æt. 28 years, has unaided R. V. = $D\ \frac{4}{24}$; L. V. = $D\ \frac{4}{12}$, S. remotum; and R. V. = $\frac{6}{15.24}$ D.; L. V. $\frac{6}{17.24}$ D. S. proximum.

With the prisoptometer she requires, without mydriatic and with duboisine, — $D\ 1.5$ c, axis 15° R. E., and the same glass axis 165° L. E..

With these glasses, both before and after the use of the mydriatic, V, each eye, = $D\ \frac{4}{12}$ and V 2 = $D\ \frac{4}{5}$ S. She can read S. D 0.6 but not distinctly with these glasses in near vision. But

when + D 1.5 c, axis 105° , R. E., and the same glass, axis 75° , L. E. is applied, vision is perfect in either eye, and $V_2 = D_{\frac{1}{14} \cdot \frac{6}{28}}$ Snellen; but she cannot, with these glasses see well in the distance, and they were ordered for near vision only, as she wishes to read and sew, and to have freedom from asthenopia.

In this and the first article mentioned no reference has been made to the fact that in vision the *vertical* lines are produced by the superimposing of image points from the *horizontal* rays upon the retina; and the *horizontal* lines by the aggregation of image-points from the *vertical* rays of light.

A CASE OF TRANSPLANTATION OF TWO SKIN FLAPS WITHOUT PEDICLE.

BY M. H. POST, M. D., ST. LOUIS.

Hannah A——, when a child had some kind of sore eyes, which, she states, got well. When ten or twelve years old she had measles, eyes became sore and here continued irritable to the present time.

When fourteen years old the eye-lashes rubbed upon the ball, threatening loss of sight, and an operation for correcting this condition was recommended and performed by a physician not residing in this city. Large pieces of skin were removed from both upper lids. Whether the lid margins were split after the Jæsche-Arlt method or not I am unable to say.

So much tissue was removed that immediately after the operation the patient was unable to close her eyes. For about two months they did well and were not painful, then they became sore and continued growing worse till she consulted Dr. John Green, of this city, nine years later, in June, 1882, at which time there was entropion with trichiasis. He performed subsection of the upper lid O. D. and O. S., which was completely successful, and the patient was placed in my care to look after the keratitis from which she was still suffering.

Though the hairs no longer rubbed, the lids could not be closed except by a strong effort, and to protect the corneæ she rolled them up under the upper lids. This was not adequate protection. The wind and dust striking against the exposed portion of the corneæ continued to increase the keratitis till the lower half was almost dermoid in appearance, while the upper portion remained comparatively clear.

After considering various plans I decided to attempt to protect the corneæ by restoring the upper lids to their normal width, by transplanting large flaps without pedicles.

The patient was sent to the St. Louis City Hospital, and after having her wait there for several weeks, and selecting a time when her health seemed to be very good, the operation was performed on O. S., Nov. 15, 1884.

The day previous I had made a careful estimate of the amount I wished to gain, and had carefully mapped out on the inside of the right arm the piece I intended to remove, the measurements of the flap being one-half greater than those of the place it was designed to fill, to allow for its contraction after it had been dissected from its underlying connective tissue.

The patient was placed under ether: An incision parallel to the margin of the upper lid, and about one mm. from the row of cilia was made. The skin was carefully dissected from the superficial fascia till the lid could easily be brought down and closed over the globe, then the margins of the lid were stitched together with silk sutures, care being taken to so place them that they should not rub upon the eye. After this the lashes of the upper lid were stuck to the lower lid by collodion, thus holding the lid as nearly immovable as possible. The operation had thus far lasted about an hour.

The next step was preparing the flap. With a knife following the ink lines previously made, the skin was cut through except along part of one side, where the cut was extended beyond the inked line in order that a piece of skin might be included in the flap which could be held in the forceps and used as a handle and afterwards cut off lest any portion of the flap which might be contused by the forceps should be reduced in vitality and slough.

In dissecting the flap great care was taken to get nothing but the skin; to secure this, after the flap had been dissected up, it was turned over and with scissors and forceps everything looking like connective tissue was cut away.

The denuded surface on the lid was now carefully cleansed of all blood clots, the flap cut loose, conveyed to its new position and nicely moulded into place; it was necessary to trim it somewhat. Small bits of linen cut from a well-worn cambric handkerchief, 10 mm. long by 2 mm. broad, were fastened to the skin and flap with collodion, for the purpose of retaining the

flap in place instead of stitches; over the whole goldbeaters' skin was placed. This was done rapidly in order that the flap might lose as little heat as possible. As soon as the goldbeaters' skin was in place absorbent cotton wrung out from very hot water was applied and kept on for about ten minutes, and then replaced by fresh cotton wrung ¹drier than that first used; this was covered with dry cotton, and the whole retained in position by a flannel bandage.

Both eyes were bandaged; the patient was put to bed and kept very quiet till the next day, in order to prevent vomiting from the effects of the ether; after this she was allowed to sit up as much as she desired.

The patient was carefully watched, and as her general condition was good and there was no pain in the eyelid, the original dressings were not disturbed for three days; then they were removed down to the goldbeaters' skin; a piece of this at the inner angle was clipped off, in order to allow a little pus to escape, which had collected in the conjunctival sac. A small piece of goldbeaters' skin was placed over the spot which had thus been uncovered, and the eyes were dressed with absorbent cotton and a flannel bandage.

From this time on the dressings were removed daily till Nov. 25th, twelve days after the operation, when the cotton dressings were replaced by a soft handkerchief.

The flap had taken throughout its entire extent, except a small portion at its inner extremity where it had slightly overlapped the skin. On the 28th, fifteen days after the operation, all the dressings were removed; the epidermis peeled off, leaving the flap in a healthy condition, and exposing no granulating surface. From this time only a protecting bandage was worn, which was gradually dispensed with, and the patient left the hospital March 8th, 1885.

Unfortunately, I can not state the exact time when the stitches, holding the lids together, were removed, as through some mistake a note was not made of it, or, if made, has been lost. I know that they were carefully watched and left in for about two weeks.

The operation on the other eye was not at once undertaken,

as I wished to see what would be the result of the first operation after the graft had had time to contract.

Having waited for this purpose nine months, and the result being very satisfactory, she again entered the hospital July 13th, '85, and on the 31st, having waited eighteen days to make sure that her general condition was good, the lid of O. D. was operated on. This operation did not differ essentially from the first, except that, in order to save time, the flap was dissected up by Dr. A. E. Ewing, and I depended entirely upon the goldbeaters' skin to keep the flap in place; in this I was not disappointed, as it served admirably. Ten days after the operation the stitches holding the lids together were removed.

Unfortunately, just about the time of the operation, a patient, who had been badly burned, was placed where the offensive odors from the case pervaded the ward where the patient upon whom we had operated was located. She suffered in health so much that it was necessary to prescribe tonic treatment. This condition affected the flap so that a portion, 14 mm. long by 2 mm. broad, along the upper inner margin, sloughed; it also affected the wound on the arm so that it took on a bad condition and required for its healing from July 31st to Oct. 19th, two months and a half, whereas the first was entirely healed in less than four weeks.

The difference in the two results I believe to be due to the difference in the condition of the patient, and emphasizes the importance of securing the most favorable surroundings, when undertaking any plastic operation.

In a recent case I have again operated in the manner just described; but with the difference that the transplated skin was taken from the prepuce of an infant. On the removal of the goldbeater's skin, ten days after the operation, a portion of the flap was found to have perished; the lower two-thirds of the denuded surface of the lid, however, were covered by a delicate skin tissue.

Extreme difficulty was experienced in freeing the very delicate preputial skin of all subcutaneous tissue. The result of the operation promises to be entirely successful.

WHY ASTIGMATISM OF LOW DEGREE SHOULD BE FITTED WITH DIFFERENT LENSES FOR THE NEAR POINT AND FOR DISTANT VISION.

BY F. CORNWALL, M. D., SAN FRANCISCO, CAL.

My attention was called to this subject by reading an article in the August number of this Journal by H. Culbertson, M. D., Zanesville, Ohio. He recommends (which is not new) the application of a plus cylinder in cases of myopic astigmatism of low degree, the axis being placed perpendicularly to that of the minus cylinder used for distance. The new idea he advances is that this principle applies particularly to cases of spasmodic myopic astigmatism and that of very low degree (0.25 D to 0.5 D).

I would like first to know what the doctor means by spasmodic myopic astigmatism? If he refers to spasm of accommodation producing an astigmatism, then, I should think, the spasm should be overcome by other means than by glasses; just the same as in myopia from spasm. If he means that there is a spasm of accommodation so that the emmetropic meridian becomes the myopic one, and the hypermetropic one becomes emmetropic, then it becomes a question whether the eye should be corrected in this state of spasm.

In his second paragraph he takes his own case, in which there is spasmodic myopia in the vertical meridian of 0.5 D and corrects it with a concave cylinder axis 180° for distance, and for the near point with a convex cylinder axis 90° . In a state of rest, or without the spasm, his eye would have hypermetropic astigmatism in the horizontal meridian, and hence the correction the doctor makes for the near point is the one that should be made for distance, and the eye should be educated to overcome the spasm. The correction of the astigmatism, perhaps, would be sufficient to accomplish this. It would seem to me just as wrong to correct a spasmodic astigmatism as a spasm of accom-

modation producing an artificial myopia in an emmetrope or hypermetrope. The doctor has wisely made his eye emmetropic for the near point, but for distance required it to be in a state of spasm in order that he may see with his correcting glass.

In the beginning of the third paragraph he scarcely makes it plain why it would not answer in his case to use the concave cylinder axis 90° for the near point. By placing the axis of his correcting lens perpendicularly to the one which corrects his astigmatism, he would leave the vertical meridian still myopic 0.5 D and render the horizontal (which was emmetropic) 0.5 D hypermetropic, making a case of *what is called* mixed astigmatism.

He speaks of the vertical fibres of the muscle of accommodation contracting while the horizontal ones do not. It is an accepted theory, I believe, that the circular fibres of the ciliary muscle constitute the muscle of accommodation. I fail to conceive how a *vertical* part of this elastic band surrounding the crystalline lens could contract in the vertical diameter. I cannot see how the circular fibres of the ciliary muscle may be made to contract so as change the refraction of the lens in one meridian more than in another. In order to lessen the circumference of a circular band it makes no difference whether the contraction takes place in one locality or uniformly along the course of the band (? Ed.) I must confess, however, that astigmatism does occur temporarily in some instances, and it would seem from spasm of accommodation, but how it could be explained according to the accepted theories of refraction I am not able to conjecture.

Recurring again to the subject of using a convex cylinder for reading in a case where myopic astigmatism has been corrected with a concave cylinder for distance, this we do for the same reason that we give a myope a different lens for near vision than for the distance. Some object to this, claiming when an eye is made emmetropic that it should be able to perform all the functions of a naturally emmetropic eye. I will give my reason (which may not be a new one) why a myopic eye can not, after correction, have all the adaptability of the emmetropic eye, and this will apply equally to cases of myopic astigmatism. Refer-

ring to works on histology and pathology we find the circular fibres of the ciliary muscle undeveloped in the myope while in the hypermetropic eye there is an excess of development. The reason for this is manifest, *viz.*, that in the myope there is no accommodation required—even at the near point—and consequently there is no development of these circular fibres. Now, in a case of myopic astigmatism the patient will adjust the eye for distance for the emmetropic meridian, but for the near point will adjust for the myopic meridian. The reason for this is plain. Of a necessity the eye will adjust for the emmetropic meridian for distance, as this leaves the eye in a state of rest and at the same time secures the best vision, but for the near point the myopic meridian is chosen because less accommodation is required and objects are equally distinct. This being the case, the muscle of accommodation remains undeveloped above the point required of it to adjust for the myopic meridian. In a case of 2. D of myopic astigmatism the patient places objects at the same distance, and uses the same amount of accommodation as the myope does at this point. We will suppose a case of — 1.5 D of astigmatism; correct the myopic meridian for distance making the eye emmetropic, but for the near point, for reasons already given, a convex cylinder may be used, axis perpendicular to the axis of the concave cylinder used to correct for distance, and a most satisfactory result will be obtained in almost every case. This leaves the eye myopic 1.5 D, but as we know a myope of this degree has the advantage for near work. In very young people whose muscles of accommodation, it would seem, might be susceptible of cultivation one dioptre of myopia is as much should be left for the near point, and this should be modified by the degree of astigmatism, but in presbyopia the plane of the reversing axis in cases of myopic astigmatism can be carried to a sufficient degree to correct the presbyopia.

My observation is that those who correct myopic astigmatism the same for the near point as for distance have a bad success in practice.

A CASE OF CHOROIDITIS FOLLOWING TYPHOID FEVER.

BY F. C. HOTZ, M. D., CHICAGO, ILLS.

Among the affections of the eye which have been observed as sequelæ of typhoid fever, we find recorded¹ only corneal ulcers and abscesses; disturbances in the muscular apparatus (paresis of accommodation and sphincter pupillæ and paralysis of one or the other of the external muscles of the eyeball); and affections of the optic nerve (transitory blindness without any manifest changes in the fundus, and atrophy of the optic nerve). It will be noticed this list does not mention any affections of the uveal tract; and this apparent immunity of the choroid to the effects of typhoid fever appears very remarkable if we consider the fact that other acute infectious diseases have been known at times to cause serious disturbances in this tunic.

Cerebro-spinal meningitis, for instance, has occasionally been followed by choroiditis with a plastic exudation into the vitreous resulting in partial atrophy of the globe. And *relapsing fevers* (febris recurrens) have sometimes been observed to cause an inflammation of the anterior portion of the uveal tract (cyclitis and iritis) with opacities in the vitreous, deposits upon Descemet's membrane, and posterior synechiæ; but no visible changes in fundus.

That similar disturbances may occur also in the course of typhoid fever the following case shows in which the choroiditis became manifest during the convalescence of the patient from a severe attack of typhoid fever. The case is interesting also for the rapid improvement which followed upon the hypodermic injections of pilocarpine.

Jan. 13, a farmer, aged 26 years, the picture of a healthy ro-

¹ Graefe—Saemisch, Handbuch vol. VII, p. 167.

bust young man, consulted me in regard to his left eye. In October he had a very severe attack of typhoid fever, and during reconvalescence he noticed the sight of his left eye, which prior to his illness he is positive was as good as the right eye, was gradually failing and finally became entirely obscured. He never had any other disease, and is absolutely free from syphilitic taint.

Status præsens. R. E. $V = \frac{20}{XX}$, Em. normal fundus. L. E. counting fingers at 12 feet; no pain, no tenderness, no redness; cornea aqueous humor and lens clear; pupil slightly enlarged (no mydriatic having been used.) Tn. In the vitreous numerous floating opacities; still the fundus could be illuminated sufficiently to discover a large whitish exudation in the periphery of the superior nasal section of the fundus.

The patient not prepared to stay in the city at once, was given Pot. Iod. five grs., three times *pro die*.

He returned February 5. While at home, the eye became inflamed, the inflammation (evidently iritis) lasting two weeks. I found upon the anterior capsule of the lens a circle of brown pigment dots just outlining the size of the pupil as it was found on the first examination. Now the pupil was still larger; and the vitreous was clouded up so densely that the ophthalmoscope yielded but a very faint reddish—gray reflex and the sight was reduced to barely counting fingers at one foot.

I now prevailed upon the patient to stay and submit to a course of hypodermic injections of pilocarpine. Each injection of $\frac{1}{6}$ gr. produced a profuse perspiration and copious secretion of saliva for over one hour.

After five injections administered in one week the vitreous was considerably clearer and V had risen to $\frac{20}{L}$; but the patient felt so weakened by the treatment that he insisted on a short intermission.

During this intermission, however, the sight grew rapidly worse and in one week (February 20) sank to $\frac{20}{C}$; Descemet's membrane became dusty and the vitreous very muddy again.

Pilocarpine was again injected with happy result; in one week V was again $\frac{20}{L}$; the vitreous was cleared and the ophthalmoscope distinctly showed a number of disseminated white patches in the upper nasal section of the choroid.

From that time on (February 27), the eye continued to improve; March 28, very few small opacities in the vitreous, $V=\frac{2^0}{XXX}$; and May 21 $V=\frac{2^0}{XX}$; vitreous clear; in the upper nasal periphery of the fundus numerous small spots of choroidal atrophy.

TRANSLATION.

In the *Archives d'Ophthalmologie* Professor Badal has published an article "on the total extirpation of the lachrymal gland" which is of special interest, since the author relates in it a case in which he was enabled to see the orifices of the ducts of the lachrymal gland proper and of the accessory (palpebral) lobules and to study the function of these glands. The patient having been stung by an insect, had lost most of the tissues surrounding the orbit by gangrene, and an ectropion had resulted which laid bare the conjunctival orifices of the excretory ducts coming from the lachrymal glands.

The paper ends with the following conclusions:

1. The orbital portion of the lachrymal gland is by its fibrous capsule perfectly isolated from the palpebral portion; its complete removal presents no serious difficulty and causes no danger to the person thus operated upon.

2. There is nothing more difficult than the total removal of the lobules of the accessory portion, which are disseminated and—so to speak—lost in the depth of the lid.

3. The removal of the orbital portion has no disagreeable influence on the lubrication of the eye, which simply can no longer shed tears.

4. It is possible that this portion of the gland has the exclusive function to secrete the tears proper. Its action would then simply be due to the influence of moral or physical causes which provoke *tears*.

5. The accessory gland would then have the duty to help the other palpebral glands in the lubrication of the eye. Its permanent and regular secretions would be little or not modified at all by the excitations which bring about the secretion of the orbital gland.

If this hypothesis, which is furthermore strengthened by a certain number of facts, would prove to be correct, the portion

of the gland which, almost contemptuously, is called the *accessory* portion, would in reality be the *lachrymal* gland proper and not play a secondary role.

6. The excretory canals of the orbital and palpebral portions together are, at least in certain subjects, much more numerous than is usually admitted by the modern authors. The extreme difficulty which is experienced in demonstrating these canals on the dead body is perhaps the cause that some of them have escaped detection.

7. It is certain that at least a part of the canals coming from the orbital gland are not joined by those coming from the palpebral portion.

8. The removal of the palpebral portion of the gland might be attempted, when the removal of the orbital gland would not suffice to heal a disagreeable *stillicidium*. However, the possibility that the lubrication of the eye would be interfered with by this operation must be dreaded.

9. The simplest way to search for the palpebral lobules is by making an incision along the outer third of the orbital arch and prolonging it a little below the palpebral commissure.

10. In cases of incurable ectropium with abundant stillicidium, the removal of both portions of the gland might be performed in one session and by the same incision, starting from the middle of the orbital margin and reaching the outer commissure.

REPORT OF THE OPHTHALMOLOGICAL SOCIETY OF HEIDELBERG, GERMANY.

(Translated from the report of A. M. Montprofit, *Archives d'Ophthalmologie*).

SEPTEMBER 15TH.

The meeting was opened by Prof. Zehender, of Rostock.

The prizes offered by the Ophthalmological Society were then awarded: The Græfe prize (a gold medal) was unanimously given to Prof. Helmholtz. The prize founded by Welz for the best article published during two years in Græfe's Archives was

awarded to Dr. Samelsohn, of Cologne, on account of his article on central scotoma and retrobulbar neuritis.

Professor Leber, of Göttingen, then took the chair.

First Communication.—*Dr. Landolt, of Paris: On the Insufficiency of Convergence.* Having referred with a few words to the definition of the range of convergence, the principles and methods of measuring it, the author came to the interesting subject of his paper, the insufficiency of this function, the frequent cause of asthenopia.

According to him there are two forms of insufficiency of convergence which must well be distinguished from each other: 1. The muscular insufficiency proper, due to the weakness of the internal recti muscles, to their unfavorable insertion, or to the preponderance of their antagonists. 2. A neurasthenic insufficiency of convergence, from a central cause due to an obstacle to innervation, a lesion of the center of convergence. In the first case, the field of binocular fixation, as well as the monocular fields are more or less limited; in the second case, the excursions of each eye may be normal, but the range of convergence is considerably restricted. But the difference between the two forms of muscular asthenopia is especially pronounced by the effect of the operations of tenotomy and of advancement. In the purely muscular insufficiency these operations, when properly executed and dosed (the author gave here the indications), cannot only improve the asthenopia, but even increase the range of convergence. On the contrary, in the neuropathic insufficiency, their result is almost always insufficient, often nil, even decidedly bad. The author proved his opinions by observations of the different forms on some very characteristic asthenopic patients, which before and after the operation had been examined by his method of examination. Finally, he explained what might be termed the relative insufficiency of convergence (or of accommodation), *viz.*, the condition in which both these functions are normal but where there is an obstacle to their joint action. This can easily be recognized and valued by the aid of the author's dynamometer, and is usually cured by correcting glasses.

Second Communication. Professor Sattler, of Erlangen, read a paper on *The Infectious Germs Found in the Secretions*

of the Lachrymal Sac and Their Resistance to Antiseptics. He had examined the secretions of twenty-eight lachrymal sacs. He collected the fluid with an instrument made of platinum, heated and sterilized and spread it on gelatine. After twenty-four hours he observed the development of isolated cultures. He found a large number of different species of germs. The pyococcus filogenus, presenting two varieties, one white, one orange, forms about eighty per cent. of the germs; this is but little malignant. The streptococcus pyogenus has never been met with; but he has several times found some staphylococci which seem to be the cause of those infectious forms of keratitis, which become rapidly complicated by iritis. He further found the pneumococcus. He has distinguished six different species of bacteria, one of which showed spores. The author then spoke of his researches concerning antiseptics and their action on different organisms; a solution of corrosive sublimate 1 in 10,000 is insufficient; the corrosive sublimate, one in 5,000, is, however, sufficient to insure antiseptis, as for instance in cataract operations. He spoke of the practice of Professor Panas of Paris, who uses hydrargyrum bijodatum, one in 20,000, but stated that it was impossible to obtain such a solution, the most concentrated solution of this drug being one in 30,000 and then insufficient for antiseptis; he added further that by dissolving the hydargyrum bijodatum in a solution of the bichloratum of one in 5,000, a fluid of very powerful antiseptic properties will be obtained.

Third Communication. Prof. Zehender, of Rostock, studied the *Effect Produced by the Refraction of Lenses, when the Rays of Light Fall Obliquely on the Lenses.* There results a particular deformity of the images, which varies when a screen is put in front of or behind the focal space. He demonstrated the fact on his apparatus and by means of a number of photographs. Mr. Zehender stated that the astigmatismus, due to an inclination of a spherical lens, can always be corrected by a cylindrical lens properly placed; he thinks that the poor visual acuity of many eyes after cataract extraction is due to an error in the sphericity caused by the correcting glasses, and since he obtains the least error in the sphericity when (in his apparatus) the plane surface of a plano-convex lens is turned toward the screen,

he proposes for those operated on for cataract to use spectacles composed of two plano-convex lenses, put together with their convex surfaces.

Dr. Landolt remarked that this proposition has already been made by Donders in his first edition.

Fourth Communication. Dr. Stilling, of Strassburg. On the Genesis of Glaucoma and on the Conditions of Filtration in Glaucomatous Eyes. He considers the experiments with potassium ferrocyanicum to be insufficient; those made with fluoresceine are not much more conclusive. These fluids do not impregnate the vitreous body in an equal manner in all its parts, and can on the other hand get in between choroid and retina. In the normal condition the phenomena of filtration are seen only by way of the sheath of the optic nerve, as there exists no anatomical communication between the vitreous body and the anterior chamber. When the optic nerve is cut and, after its ocular end has been ligated, the fluoresceine is injected subcutaneously, the optic nerve shows its green color. The younger the eye, the more active the filtration; a young eye in twenty-four hours filters three times more than its volume; the filtration diminishes with the age. An eye conserved in Mueller's fluid filters much more than a fresh one. The glaucomatous eye, however, always filters less, also when conserved in Mueller's fluid. Dr. Stilling considers glaucoma to be an increase of intra-ocular pressure due to a diminution of filtration. This diminution of filtration of the eye is due to anatomical changes which have their seat especially in the seat of the optic nerve. The glaucomatous eye is a senile eye. The author speaks of—not a comparison, nor an analogy—but a simple similarity between the glaucomatous eye and the senile prostatic gland. In both organs the accidents due to the alteration, so very different from an anatomical point of view, are subject to occasional causes, as for instance, a cold, which is the most important one.

Fifth Communication. Professor Brettauer, of Triest, made a very interesting communication on Three Cases of Spontaneous Clearing up of Senile Cataracts, Without Capsular Lesion, and with Returning Vision. For these three cases the process took from nine to thirteen years, and the resorption of the cataract

was accompanied by the formation of numerous crystals of cholesterine. Sight was perfectly re-established in these patients by convex glasses, as those operated upon for cataract need them. The vitreous remained clear in all of these cases. One of the patients comes from a family in which six cataracts have been removed, and had been himself operated upon on the fellow eye at the age of 48 years.

Professor Becker, of Heidelberg, stated that he had seen Brettau's cases and was perfectly of his opinion regarding them. He declared that before having seen these cases he would have considered the thing impossible, but last year he had seen a similar case himself.

Prof. Berlin, of Stuttgart, has also seen such a case; Dr. Dufour, of Lausanne, had also had one similar case with the formation of numerous tablets of cholesterine.

Dr. Meyer, of Paris, called attention to the fact that these were not cases of clearing up of cataractous lenses, but simply of resorption of the lens.

Sixth Communication. Dr. Nordensohn on the Pathological Anatomy of the Essential Detachment of the Retina. Nordensohn supported Leber's theory; he drew special attention to the rupture of the retina and strengthened his opinion by remarkable microscopical preparations and drawings. These observations were made on enucleated eyes, especially on three myopic eyes of 3, 6 and 8 D. He thought the train of phenomena preceding accompanying and following the essential detachment of the retina was the following; there primarily a choroiditis; in consequence of this choroiditis adhesions are formed between choroid and retina; later on a subretinal fluid is formed, which, when collected in one special region, there destroys the adhesion between choroid and retina. The vitreous body now becomes retracted as the result of trophic changes due to the choroiditis; when this retraction has reached a certain degree, the subretinal fluid is the more increased in quantity; finally, it ruptures the retina and the edges of this rupture are regularly turned inwards toward the vitreous body. This subretinal fluid may even enter the anterior chamber, which then appears deeper, and the iris is tilted backwards; on the other hand, the vitreous partially pene-

trates behind the detached retina and again increases its detachment.

This is the mechanism as described by Nordensohn. He dwelled most especially on the turning backwards of the edges of the ruptured retina, and showed this plainly in several of his specimens and drawings. He found the rupture of the retina to be present in all cases. * * * * The role which the spasm of the accommodation may play in the detachment of the retina was also mentioned by Nordensohn.

Seventh Communication. Dr. Hoffmann on Hypopyon-keratitis and the Formation of the Hypopyon. Around an irritated or diseased point of the cornea vacuoles are seen to be formed and serrated cells put in appearance. This point then has apparently some attraction for the leucocytes, which come in large numbers through the periphery of the anterior chamber. These cells are then found to be very numerous between Decemet's membrane and the corneal tissue proper, although there is no perforation of this membrane.

Professor Horner, of Zuerich, said that according to Backova's and Landolt's studies the production of the hypopyon was somewhat different, the pus being formed on the level of the ulcer, Descemet's membrane is perforated on the same level, and the pus then falls down and is collected in the lowest part of the anterior chamber.

DEMONSTRATION.

Dr. Schoenmann showed a patient who had for two years had a paralytic ptosis; the doctor had performed the advancement of the levator palpebræ superioris with complete success, the scar being scarcely visible.

Professor Kuhn, of Jena, showed microscopical specimens of an ulcer healed by the transplantation of a conjunctival flap, the patient having died of an intercurrent disease. A short time after the transplantation, the formerly considerable pain had disappeared.

Dr. H. Virchow showed anatomical and microscopical specimens concerning the ciliary body and its folds; he gave the results of his researches with regard to the structure of the vitre-

ous body. Squeezing the vitreous body hard in a fine linen cloth, drives out all the liquid parts and round fibres of marked resistance are found, which are even capable of bearing a considerable weight.

Dr. Nordensohn exhibited specimens showing the retraction of the vitreous body.

Professor Arlt asked whether Nordensohn regarded the retraction of the vitreous body as a primary phenomenon.

Nordensohn did not consider it as such, but thought it to be consecutive to the choroiditis.

Dr. H. Virchow remarked that the use of Mueller's fluid for hardening the eyes can give rise to grave errors in the study of the detachment of the retina, since it often produces detachment. He prefers corrosive sublimate for hardening.

Dr. Eversbusch described the method of hardening eyes by means of a concentrated solution of corrosive sublimate. First, the eye is washed in corrosive sublimate solution one in 5,000; then it is put into a saturated solution for half or three quarters of an hour; after this the eye is immersed into diluted alcohol of 60°, to which is added so much of the tincture of iodine that it ceases to become discolored. When this is done the eye is put first into diluted and then into absolute alcohol.

Dr. Nieden showed a registering perimeter which enables the examiner to register the results of the examination on a schematic tracing. This perimeter is called Hardy's perimeter, manufactured at London, by Picard & Curry.

Dr. Jany showed an electro-magnet for the extraction of metallic foreign bodies. This magnet is very voluminous, apparently little manageable and requires a rather strong battery.

Dr. Landolt presented his muscular dynamometer and his blepharostat, which the readers of the *Archives* know from the description he has given. He showed, furthermore, a new fixation forceps destined to hold the muscle which is to be tenotomized. He does not use the hook to catch the muscle, but grasps it directly with the forceps.

SEPTEMBER 16TH.

Eighth Communication. Dr. Wolfsberg, of Berlin, made a

report on the *Diagnostic Value of the Examination of the Color-Sense*, and showed an apparatus for the examination of the central and the peripheral light sense. He tried to determine the reciprocal relation between the light-sense, the color-sense and the visual acuity, and the variations which these relations undergo under the influence of various degrees of illumination and of the diseases of the eye.

Ninth Communication. Professor Becker, of Heidelberg, presented some artificial eyes from the factory of Mueller, of Wiesbaden, and gave some details concerning the mode of their fabrication. He then showed how to draw a schematic eye for theoretical demonstrations.

Tenth Communication. Professor Pflueger, of Bern: *How can Certain Symptoms of Glaucoma be Explained by the Theory of Increased Intra-Ocular Pressure.* He was not satisfied that the increased intra-ocular pressure is the predominating symptom, and he dwelled especially on the following three points:

1. The glaucomatous halo is not caused by an atrophy, due to an increased pressure, but to the presence of an exudation, which the author has found between choroid and retina.

2. The coming and going of the central and paracentral scotoma without any therapeutic interference.

3. There are cases of glaucoma with a complete loss of sight, where no excavation is found.

Eleventh Communication. Dr. Kundt spoke, too, of the *Pathological Anatomy of Glaucoma*. He had the same opinion about the nature of the halo. He thinks its formation is due to an exudation. He has been able to prove this to be the fact by the examination of eyes which had been observed during life. According to him there is a distinction between the complete halo and the growing atrophic halo of the choroid, which is a senile phenomenon. Just where the halo is, he found a characteristic exudation between choroid and retina. He found this exudation in all glaucomatous eyes which he had occasion to examine. By the formation of this very exudation he thought we can explain the rapid variations of the field of vision, the scotomata that come on and disappear. The choroid seems very thin, its outer layers are compact; they may even adhere to the

sclerotic around the optic nerve entrance, and sometimes even as far as the equator of the eye. There is, then, no longer any subchoroidal space. All the blood vessels show alterations, their caliber is reduced to one-seventh to one-tenth; the arteries present the lesion of endarteritis, periarteritis and mesoarteritis; the walls of the veins are very thick, the connective tissue is hyperplastic. In these glaucomatous eyes we find, furthermore, senile changes of the choroid, the retina, the ciliary body, new formation of blood-vessels, formation of pigment, etc. The lymph fluid seems chemically altered; it actually here and there obstructs the lymphatic vessels.

Twelfth Communication. Professor Manz, of Freiburg: Acute Attack of Glaucoma after the Instillation of Cocaine.—The action of cocaine upon the pressure is variable. In some cases it is followed by a pronounced diminution of pressure, often even by such a considerable diminution that it may be called a collapse. Manz has seen one such case. In other cases an increase of pressure is produced. In one case Manz has seen an acute attack of glaucoma being produced by *one drop of cocaine* (cured by iridectomy); the patient had suffered from the prodromal symptoms of glaucoma, and it may, therefore, be doubted that the acute attack was due to the cocaine.

Thirteenth Communication. Dr. Hoeltzke on Researches Concerning the Intra-Ocular Pressure. (Our readers will find the particulars of this paper in our last number.—EDITOR.)

Professor Pflueger thought that atropine does not cause an increase of intra-ocular pressure.

Dr. H. Virchow stated that from an anatomical view there is no difference between the eye of a dog and that of a cat. It is therefore rather strange not to vindicate to the latter the faculty of accommodation, since the experiments concerning accommodation, made by Voelkers and Hensen, and on which our theories of the mechanism of accommodation are based, were made on dog's eyes.

Professor Sattler objected to the statements made concerning the reduction in thickness of the choroid in glaucomatous eyes, and said that this could only happen after a very prolonged period; in the beginning the choroid, on the contrary, being considerably swollen.

Prof. Leber, in giving his experiences with apomorphia, stated that he had obtained but a momentary insensibility of the cornea with this drug; but aside from the insufficiency of this agent, it presents another inconvenience by causing nausea, if an active dose is used. It is, therefore, not valuable as an anesthetic and cannot supplant cocaine.

Fourteenth Communication. Dr. Weiss, on the First Modifications which Myopic Eyes Undergo. He described the arch-like reflex which is often seen in myopic eyes to be situated on the inner side of the papilla. In 1,094 eyes it was found 415 times, 38 per cent. Weiss thought this reflex was due to an elevation caused by exudation. If the myopia increases, this exudation increases also; the crest formed by its highest point disappears gradually and the surface, now plane, no longer favors the formation of the reflex, which then vanishes. Drawings and anatomical specimens were shown. The author then spoke of the length of the optic nerve in myopic eyes, and stated that it is always reduced, and that this shortness causes a difficulty in converging, and thus the eyeball is bent in. These differences in the length and curvature of the optic nerve have been found in more than forty autopsies.

Professor Schmidt-Rimpler criticised very justly the intelligent way in which the Prussian government had the statistics prepared concerning the myopia in schools and gymnasiums without taking into account the age and heredity. These conditions must be observed in rational statistics. The heredity is especially well known to play an important role in it; this is nothing new; at Frankfort 32 per cent. of myopes were found in two gymnasia, and in 75 or 76 per cent. of these cases heredity existed. The high degrees of myopia (6 D) are somewhat more frequent in the higher classes.

SEPTEMBER 16th. EVENING SESSION.

Fifteenth Communication. Dr. Schubert, of Nuernberg, made a communication concerning *the Position of the Head During Writing*; he showed the importance of such studies on children, and counsels to use the right-handed method, and to place the paper straight before the head of the child without any

lateral inclination. The author thought that formerly this was the method most employed; he held that this idea was borne out by examining very old manuscripts in the library of the city of Nuernberg, and of which he passed around the photographs. In these manuscripts the letters are really perfectly vertical, but several members thought that these manuscripts were actually pieces of calligraphy, and that they are, therefore, written under circumstances which do not allow us to attribute to them so much importance as Dr. Schubert would like to.

Sixteenth Communication. Dr. Vossius speaks of the *Operative Treatment of Trachoma*, and advocates especially the excision of the conjunctival fornix, which has given him good results.

Dr. Coninck, of Amsterdam, has found trachoma to exist extremely frequently among the poor sick of the city of Amsterdam. He has, furthermore, noted it to be more frequent among the Jews than among the Christians. This fact is more visible in the schools; in the Jewish schools the trachoma is found in 75 per cent. of all the eye diseases. It is very remarkable that trachoma is also met with more frequently in married than in unmarried women of the same age. This fact the author attributes to the more frequent occasions for taking cold, to which the Jewish women are exposed, on account of the monthly baths prescribed by the Jewish law; this opinion, although original, may be disputed.

Seventeenth Communication. Dr. Meyer reported an *Interesting Case of Anomalous Condition of the Ophthalmic Artery*. The eye of a very weak, young and very cachectic child was removed on account of grave inflammatory lesions. During and after the operation more arterial blood was lost than is usual. The hæmorrhage was, however, stopped. Four days afterwards the child died from acute general tuberculosis. The post mortem showed that there existed the following anomaly of the ophthalmic artery. The artery was much smaller than ordinarily; instead of reaching the optic nerve from above, it reached it from below; finally, the branches which usually spring from the ophthalmic artery, originated in this case from a comparatively large branch of the middle meningeal artery and entered the

orbit through the sphenoidal fissure. A lesion of this artery caused the abundant hæmorrhage which followed the operation.

Eighteenth Communication. Dr. Cross, of Bristol, reported a case of *Removal of a Tumor from the Orbital Cavity*, which gave rise to an abundant hæmorrhage. He was obliged to make the ligation of the common carotid artery. The patient recovered. The histological nature of the tumor had not yet been determined, and it was, therefore, impossible to give a prognosis. The interesting point was the immediate stopping of the hæmorrhage when the carotid artery had been tied.

Nineteenth Communication. Prof. Knapp, of New York, made the following communications:

1. On a dim, grayish discoloration around the optic papilla of congenital origin. Knapp has seen two such cases concerning children of a strumous habit, weak and suffering from nystagmus might be found comparatively frequently.

2. On embolism of the central retinal artery, in which the branches of the macula lutea remained free. Two cases were related.

3. On the healing of a hyaline infiltration of the conjunctiva by electrolysis. Knapp considers this hyaline infiltration to be the first stage of an amyloid degeneration.

4. On the destruction of a vascular tumor of the episcleral tissue by means of cauterization.

CORRESPONDENCE.

DEAR DOCTOR:—I noticed an error of mine in my paper which should be corrected. See August number American Journal Ophthalmology. p. 184. Strike out in line second and third the words. "having been prevented by the negative cylinder from receding to j:" and in the second line, after "plane," make the comma a period.

Very respectfully,

H. CULBERTSON

Zanesville, Ohio.

DEAR DOCTOR:—I would suggest publishing this query in the next issue of the JOURNAL OF OPHTHALMOLOGY:

Yours respectfully,

F. F. C. VAN ALLEN.

I would ask Mr. L. Webster Fox if he would kindly explain the manner of grinding spher. + 10D \bigcirc cyl. + 3D, axis 180°, \bigcirc cyl. + 2 D. axis 50°, in ONE? I think an explanation would be of great interest to ophthalmologists and opticians.

Respectfully, F. F. C. VAN ALLEN.

Albany, New York.

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No. 11.

OPERATIONS FOR GLAUCOMA, OCCURRING IN THE
PRACTICE OF C. R. AGNEW, M. D.

REPORTED BY DAVID WEBSTER, M. D., NEW YORK.

1. CASES IN WHICH IRIDECTOMY WAS PERFORMED ON BOTH EYES
AT VARYING INTERVALS.

CASE I. Oct. 25, 1873, Miss S. H. J., aged 36, was formerly occupied in making fine rosettes for horse harnesses, but had to quit the work six months ago on account of her eyes, and has since been engaged in packing fruit. General health poor; is nervous and subject to sick headaches. First noticed pain over eyebrows about ten months ago, after reading. For two weeks after that she could not see objects straight ahead, but only to the temporal side of the fixation point with either eye. She first saw "rainbows" about lights last winter, and more or less ever since. She was annoyed by double vision for a week or two in May.

The pupils are both dilated and sluggish, but the left more so. Both anterior chambers are shallow, and the tension of both eyes is increased, but the right is more so.

R. V.=Counts fingers with some uncertainty at 18"; visual field 4" vertically and 4" horizontally, and wholly to temporal side of fixation point.

L. V. = $\frac{20}{L}$; made $\frac{20}{XX}$ with $+\frac{1}{30}$. Supero-nasal half of field absent close up to the point of fixation.

Ophthalmoscopic Examination.—Right eye, media so turbid that it is impossible to measure the depth of the excavation. Left eye, media clear, excavation 1.55 mm., marked arterial pulsation.

Oct. 30. Iridectomy upwards on the right eye, under ether. Slight hemorrhage into anterior chamber. No atropine. Flannel bandage with charpie.

Nov. 1. No pain. Blood mostly absorbed from anterior chamber.

Nov. 13. The eye has healed very kindly and the patient thinks she sees better with it than before the operation. The left eye seems to be gradually failing. It is slightly painful at times, though not reddened, and the visual field is becoming more contracted.

Nov. 14. Iridectomy upwards on left eye, under ether. Some bleeding from cut edges of iris. No vomiting from the ether after either operation.

Dec. 5. The left eye has healed as kindly as the right; visual field much enlarged; vision = $\frac{20}{XX}$.

March 23, 1874. Right visual field enlarged to 5" vertically, and 10" horizontally, and is very irregular in outline. The patient has lately been troubled with neuralgia and photopsiæ of right eye. Ordered cod liver oil with lime and strychnia.

April 13. Most of upper half of visual field of left eye is gone, but central vision remains = $\frac{20}{XX}$. Has very little neuralgia.

CASE II. Feb. 11, 1873. R. B. T., aged 54, physician, has noticed failing vision in his right eye for the last six months. R. V. = $\frac{20}{XL}$; not improved by glasses; visual field much reduced in size. Tension slightly increased. L. V. = $\frac{20}{XX}$, E.; visual field normal.

Ophthalmoscopic examination: Right eye, pulsating veins, broad excavation of optic disk, choroidal atrophy between disk and macula. Left eye, some cupping of optic disk.

Feb. 15. Iridectomy upward on right eye, under ether.

Feb. 22. The visual field is about twice as large as before the operation.

Nov. 2, 1875. Six weeks ago had a total obscuration of vision of left eye, occurring in the morning while dressing, lasting half an hour and then passing off suddenly, vision returning as good as before. Two weeks ago had a similar attack, lasting a little less than half an hour. This also occurred in the morning while dressing. Four days ago a total loss of sight occurred for the third time. The blindness this time came on in the morning just after dressing, and the sight began to return about noon. Vision has since improved very slowly, and he can now count fingers with that eye at 18" in the middle of a visual field measuring 25" vertically and 15" horizontally at one foot. The iris is bulged forward and the tension increased.

Ophthalmoscopic examination: Media clear, glaucomatous excavation of papilla $\frac{1}{6}$; arterial pulsation.

Nov. 3. Iridectomy upward, under ether. No bleeding into anterior chamber. No vomiting. Dressed with charpie and flannel bandage.

Nov. 16. V. = $\frac{2}{cc}$. Anterior chamber leaked for *eleven days* after the operation.

Nov. 17. V. = $\frac{4}{cc}$. Excised a chalazion through the edge of his eyelid. The patient was now allowed to return to his home in Virginia.

May 28, 1878. R. V. = $\frac{2^0}{L}$, L. V. = $\frac{6}{cc}$, in temporal portion of field.

April 2, 1883. "The distinguished physician, R. B. T. dropped dead from heart disease at his home yesterday"—(*New York Herald*).

CASE III. March 10, 1883. Wm. R., aged 60, agent, says that three years ago left eye began to feel rough, as though fine dust were in it. In six months the sight began to be poorer than that of the fellow eye. Lately, the sight of the right eye has begun to be defective. No external signs of eye disease.

R. V. = $\frac{2^0}{L} +$; $\frac{2^0}{XX}$ with $+\frac{1}{2}$.

L. V. = $\frac{2^0}{c} +$; no improvement with glasses.

March 22. Glaucoma simplex, both eyes. Right disk cupped $\frac{1}{2}$; scleral ring; a small artery running along the bottom of the cup and out to the temporal side of the retina pulsates. Left disk cupped $\frac{1}{6}$; lamina cribrosa visible; scleral ring; pupil

sluggish. Tension slightly increased in left. Patient never saw halos about lights, nor had colored vision, nor saw flashes of light. No subjective symptoms can be elicited except that of impairment of sight, which he has noticed two and a half years. His nervous system has been weak for several years. Has worn glasses $+ \frac{1}{11}$ for two or three years. Both visual fields are limited, the left much more extensively than the right.

April 8. R. V. = $\frac{20}{XX}$ with $+ \frac{1}{30}$. L. V. = $\frac{20}{LXX}$; no improvement with glasses.

Aug. 16. R. V. = $\frac{20}{XX}$ with $+ \frac{1}{30}$. L. V. = $\frac{20}{L}$; no improvement with glasses.

Dec. 11. R. V. = $\frac{20}{XXX}$ with $+ \frac{1}{42}$. L. V. = $\frac{20}{LXXX}$ —; no improvement with glasses.

Dec. 18. R. V. = $\frac{20}{XX}$ with $+ \frac{1}{42}$. L. V. = $\frac{20}{C}$.

Iridectomy upward on left eye, under cocaine. The patient said he felt all the steps of the operation, but that there was no pain connected with it.

The left eye was bandaged with absorbent cotton and a flannel bandage, and both were covered with a black silk shade.

Dec. 26. There has been no pain or inflammatory reaction, but there has been a leakage of aqueous humor until to-day.

March 23, 1885. L. V. = $\frac{20}{LXX}$. Patient thinks the operation arrested the loss of vision in the left eye, but has recently noticed that the visual field of the right eye was becoming more contracted. This he notices more especially in reading. In reading along he sees the word he is reading, but not beyond it.

R. V. = $\frac{20}{XX}$ slowly with his glass.

April 4. Thinks vision of right eye is becoming more indistinct and is narrowing.

R. V. = $\frac{20}{XX}$. L. V. = $\frac{20}{LXX} +$.

May 16. R. V. = $\frac{20}{XX}$ with $+ \frac{1}{30}$. L. V. = $\frac{20}{LXX}$; no improvement with glasses.

Right eye, tension increased; arterial pulsation the same as when noted at first; patient complains that he can read only a few minutes at a time because it tires his right eye so. There seems to be such a straining effort, and it makes him so nervous. He does not see so well in the street as formerly without his glasses.

May 19. Iridectomy upon right eye, upward, under cocaine.

May 30. The eye has recovered without reaction; very little redness remains about the wound; $V. = \frac{20}{xxx}$.

CASE IV. May 25, 1877, E. B., aged 55, laborer, states that his sight began to fail about four years ago, first in the left, and soon after in the right eye. He did not know that his sight was failing until he found that he could not read print. He had slight pains in his eyes at that time and occasionally subsequently. He has seen "rainbows" about lights frequently. He has noticed that his vision is better in the mornings and afternoons than in the middle of the day. An ophthalmic surgeon of Hartford performed an iridectomy upwards on the right eye last May, and another downwards on the same eye in August.

R. V. = Counts fingers at two feet.

L. V. = Counts fingers at one foot.

Right visual field 17" vertically and 15" horizontally. Left field 16" vertically and 13" horizontally, at distance of one foot. No pain in either eye at present. Tension increased in both. Left pupil dilated. Corneal and lenticular opacities of both, but the optic disks can be seen sufficiently well to show glaucomatous excavation and a broad scleral ring about them.

May 28. Iridectomy upwards on left eye.

June 6. Only insignificant pain up to date. R. V. = fingers at 4.' Visual field 27" x 23." L. V. fingers at 2.' Visual field 16" x 17."

June 9. Atropine has been used but once during recovery. Patient discharged to-day expressing himself as feeling much benefited.

2. CASES IN WHICH ONLY ONE EYE WAS OPERATED ON.

CASE I. May 8, 1876. James D., a laborer, aged 44, six weeks ago happened to close his right eye and found that his left eye was nearly blind. The sight has since remained unchanged. He gives no history of pain, photopsia or chroma-topsia.

R. V. = $\frac{20}{xxx}$. No improvement with glasses.

L. V. = Counts fingers at four feet.

Ophthalmoseopic examination shows a shallow excavation of the right optic disk, while the left disk is so excavated as to be myopic $\frac{1}{16}$.

The diagnosis of chronic glaucoma having been made the patient was placed under ether, and an iridectomy was done upon the left eye. While recovering from the effects of the anæsthetic this patient's struggles were usually violent.

May 9. No pain since operation; feels well this morning; chemosis in region of wound; bandage left off and ice cloths applied.

May 10. Less chemosis; no pain; atropine and ice cloths.

May 12. Anterior chamber still empty.

May 16. Cystoid cicatrix forming; some pain.

May 26. Eye about the same. Patient went from under observation without his amount of vision being noted.

CASE II. Sept. 23, 1880. M. W., aged 60, a boot fitter, came to the Manhattan Eye and Ear Hospital with *glaucoma absolutum* of the right and *glaucoma simplex* of the left.

Left eye shows cupping of disk with marked atrophy. Visual field at one foot about four inches in all directions from the point of fixation except nasalward, where it is five inches.

Sept. 26. Iridectomy upwards, on left eye, under ether. No notes were made of the case at the hospital subsequent to the operation, but through the kindness of Dr. H. G. Miller, of Providence, I am able to give the condition of his eyes six and a half years after the operation. Dr. Miller's examination being made on April 11, 1877.

"O. D. glaucoma absolutum; T+2.

O. S. Tn. V. = $\frac{5}{18}$. (Sn. metric).

No irritation about cicatrix; slight bulging, especially at extremities of wound. Estimated depth of excavation 1.36 mm. by Knapp's tables. The field of vision is almost wholly confined to the infero-nasal quadrant, and extends about 30°. It scarcely extends at all above the horizontal line, so that when he is writing on one line he does not see the line already written above it. In his own estimation, and in mine also, there has been no material change in the sharpness of central vision since I saw him some months after the operation."

In this case the eye affected with glaucoma absolutum was left undisturbed because it had long remained quiet, and Dr. Agnew hoped that it would continue indefinitely in that condition. The sequel seems to have proved the wisdom of the course pursued.

CASE III. April 30, 1877, R. S., æt. 35, carpenter, has had occasional pain in right eye for two months, "a heavy, dull feeling." He thinks that he can see better in the morning and that the eye feels worse after being used. He has never seen rainbows about lights. The visual field of the left eye is normal and its central vision $\frac{20}{x\bar{x}}$, with a manifest hypermetropia of $\frac{1}{30}$.

R. V. = $\frac{20}{c\bar{c}}$; Hm. $\frac{1}{40}$; visual field about circular and measures five inches in all directions from the fixation point when tested at one foot. The right pupil is slightly dilated and sluggish and the anterior chamber a little shallow. The tension is perceptibly increased.

Ophthalmoscopically, the left eye presents no lesion. The right disk is excavated to a depth of 1.55 mm.; delicate changes in the retina, apparently due to cholesterine deposits, are scattered between the disk and the macula. The media are transparent.

May 11. R. V. = $\frac{20}{c\bar{c}}$; visual field nine inches in all its diameters. Iridectomy upwards, under ether. Considerable bleeding from the wounded iris.

May 12. Anterior chamber empty except as it is partly filled with blood. Slight inflammatory reaction. Atropine dropped into the eye.

May 15. Anterior chamber still contains some blood and very little aqueous. The aqueous humor, as fast as generated, escapes into the subconjunctival connective tissue, forming a large bleb over the insertion of the superior rectus, and giving the whole ocular conjunctiva a watery, glistening, baggy appearance.

May 20. The aqueous is still leaking beneath the conjunctiva.

May 23. For the first time since the operation, a period of twelve days, the anterior chamber is partly established. The vision is $\frac{10}{c\bar{c}}$ and the eye is looking well.

May 25. The subconjunctival bleb is nearly gone, and the anterior chamber almost of normal depth.

V. = $\frac{2.0}{6.0}$ with $+\frac{1}{6.0}$ c, axis $90.^\circ$

May 30. V. = $\frac{2.0}{1.5X}$ with $-\frac{1}{3.0}$. Anterior chamber of normal depth and baggy appearance of ocular conjunctiva entirely absent.

June 27. V. $\frac{2.0}{1.5X}$ with $-\frac{1}{3.0}$. Visual field, tested at one foot, measures twenty-six inches vertically and forty inches horizontally, all the nasal portion of the retina responding to light.

CASE IV. Dec. 30, 1874, Miss C. P., aged 71, says that a little over a year ago she arose one morning with headache which lasted all day and kept her awake all the following night. The pain was all through her head, but was worse in the right eye, which seemed to be the centre of the trouble. In the early part of this summer she first noticed a dimness of the sight of the right eye, as though looking through a mist or veil. This dimness has always been present since, but has varied in density. Her left eye is weak, she thinks from sympathy. She has refrained from the use of her eyes for near work for the last two months. Her nervous system is weak, she having had an affection of the spine for many years. She was struck upon the right side of her head, a year ago last summer, by the lid of a trunk. Not long after a paper box fell on the top of her head, after which, although not unconscious, she was unable to speak for several minutes from inability to remember words.

R. V. = $\frac{2.0}{1.5X}$ }
L. V. = $\frac{2.0}{L}$ } No improvement with glasses.

Ophthalmoscopic examination shows incipient cataract, changes about the macula, and commencing atrophy of the optic nerves, both eyes.

May 4. The patient was seen by Dr. H. Knapp, who kindly sent the following notes of his examination:

"R. V. = $\frac{2.0}{6.0}$, L. V. = $\frac{2.0}{1.5X}$. Both optic nerves atrophic looking, left partially excavated, right not. Field of left complete, right field contracted inward and downward to point of fixation. Right tension increased (+1), left tension normal. Cataracta incipiens and shallow anterior chamber in both."

May 12. Iridectomy upwards on right eye, under ether, be-

fore breakfast. The patient took the anæsthetic quietly and there was no vomiting. The iridectomy was broad and peripheral. Some bleeding from the limbus occurred, but not into the pupil. No iris was left in the wound. The eyes were dressed with picked lint, a flannel bandage, and a covering of black silk.

May 13. Anterior chamber is refilled.

May 29. Patient has had no pain, but at times a most intolerable itching of the eye, "worse than pain," as she said. The redness of the eyeball has been very slight during the healing process. Sees objects, but cannot count fingers.

June 1. R. V. = $\frac{2}{c.c.}$.

June 5. R. V. = $\frac{1}{c.c.}$, L. V. = $\frac{20}{L.}$.

The right visual field is somewhat enlarged, extending infero-nasally, four inches beyond the fixation point, when measured at a distance of one foot.

CASE V. Oct. 3, 1872. J. B., 52 years of age, has atrophy of the left eyeball following an operation for glaucoma some years ago. The right eye is hard and constantly painful, and retains perception of light in only a small portion of the visual field at its extreme temporal periphery.

Oct. 18. Iridectomy upwards, under ether, without accident. Eye dressed with charpie and flannel bandage.

There was no pain until three hours after the operation, when hæmorrhage occurred, causing most sudden and intense pain in the eye, "as if struck with a hammer." The patient cried out with pain until quieted by a large dose of morphine administered hypodermically. The dressing was quickly saturated with blood.

Oct. 20. There has been no severe pain since relieved by the morphine.

This eye was operated upon at the earnest solicitation of the patient, he being fully informed that the chances of any improvement in sight were against him. It was hoped, however, that an iridectomy would relieve the pain and render the eye permanently quiet. An inflammation set in after the hæmorrhage which continued for several weeks, but the eye recovered without atrophy, as also without perception of light.

It is probable that the bleeding was from one or more of the larger choroidal vessels in consequence of the removal of the high degree of pressure to which they had so long been subjected. So sudden and so copious a bleeding would be likely to strip up the retina from the choroid. Hence the loss of perception of light.

CASE VI. Sept. 25, 1877, Mrs. L. H., aged 69, has been greatly troubled with haemorrhoids for several years and is extremely nervous. Her eyes have shown a tendency to "smoky vision" for some time, but were "good enough" until two years ago, when the right eye began to fail rapidly. The vision of the left eye began to be smoky a year ago.

R. V. = Perception of light.

L. V. = $\frac{20}{xxx}$ with $+\frac{1}{4}$.

With the left eye the patient says she frequently sees as though looking through "sticky molasses"—she sees appearances like beads, red, green and blue, with it.

Ophthalmoscopic examination shows complete and deep cupping of right disk, and some slight excavation of the left.

R. Tension much increased.

L. Tension nearly normal.

Oct. 24. Iridectomy upwards on right eye, under ether. Wound enlarged with Graefe's knife. Good-sized keyhole pupil. Atropine, charpie, flannel bandage covered with black silk. No vomiting from the anesthetic.

Nov. 1. The eye did well until to-day, when pain set in and has not been relieved by iced cloths. Ordered a leech to the right temple and codeia to relieve the pain.

Dec. 13. The vision has not risen above perception of light. The left eye has vision as when first seen, and has not changed in any respect.

CASE VII. Jan'y 13, 1879. Mrs. L. B. W., aged 60, states that Dr. Agnew operated upon her left eye for glaucoma in 1862. The eye had been sightless for more than a year, had developed cataract, and was quite painful. The pain was relieved by the operation, and the eye has given her no trouble since.

For the last week she had occasional neuralgic pains below the right eye, and, remembering the history of the left eye, is somewhat anxious.

Present Condition. Left eye shows a clean cut iridectomy, upwards and outwards, with cataract, no perception of light.

Right eye, $V = \frac{20}{xx}$; emmetropic; visual field perfect; tension normal.

Ophthalmoscopic examination shows a ring of circumdiskal atrophy, and a shallow, saucer-like excavation of the optic disk.

CASE VIII. Jan'y 4, 1876. Joseph G., aged 61, Italian sculptor, has vision $\frac{20}{cc}$ in his right eye, the amblyopia being due to old corneal opacities, and admitting of no improvement with glasses. Four or five weeks ago his left eye became red and painful. He did nothing for it except to bathe it with cold water and with rose water until a week ago when he consulted a physician who gave him atropine and an astringent wash. The eye has since been more painful. The vision is reduced to perception of light. The eyeball is deeply injected, the pupil slightly dilated and sluggish, and the tension much increased. There are numerous delicate corneal opacities, and no view of the fundus can be obtained. The fundus of the right eye cannot be well seen on account of old corneal opacities and myosis.

Jan'y 7. Iridectomy upwards, left eye, under ether.

March 15. The eye has been no better since the operation; if anything worse.

Enucleation, under ether.

The patient recovered free from pain, and has since worn an artificial eye with satisfaction. I saw him in the summer of 1885 when the sight of the right eye was reduced to about $\frac{6}{cc}$ by commencing cataract.

ESERIN SULPHATE IN GLAUCOMA.

BY DAVID COGGIN, M. D., SALEM, MASS.

In the January number of this JOURNAL the writer reported a case of acute glaucoma that, apparently, was produced by the use of a weak collyrium of atropin, and he now wishes to place on record the great relief, in two instances, that followed the use of eserine in the same affection.

On the 8th of May, Mr. W., aged 55 years, a native of New England, and a shoe-cutter by occupation, sought advice, being so blind he could not walk alone.

Sight poor O. S. for years, eye formerly red and painful—absolute glaucoma. Vision quantitative. Since January, when he could see well, O. D., occasional pain in that eye and brow which was more severe afternoons and in dull weather. “Rain-bow-colors”, mornings, O. D. only. Pupil sluggish and is dilated more than that of O. S. which is of normal size but immovable. Anterior chamber shallow. Perforating vessels enlarged. Tension + 2. Cornea somewhat anæsthetic. Sees fingers at 1 metre. No view of fundus. Good projection. Health poor. Acute rheumatism at 11th year. Now has mitral disease.

Loss of sight came on gradually. Two years ago first wore glasses for reading + 2 D. Last ones (second pair) + 4.5. Eserine sulph. (0.10:15.0) was instilled, O. D., and in half an hour the pupil was well contracted, while the vision had risen so he made out Snellen 60.

As is ordinarily the case, pain was pretty severe while the pupil was contracting. Some of the eserine solution (0.05:10.0) was given to the patient and he was sent home, to return on the following day unless his sight should continue to improve, in which case he might wait forty-eight hours.

May 10. Mr. W. walked unaided into the consulting room.

Pupil well contracted still, but the anterior chamber yet shallow. Tn. Reads Snellen 18. at 4 metres with + 2. V.=4 at 4.+4 =Snellen .50 easily. Fundus clearly visible. No cupping of disc. No view of left disc. That eye still has T+.

Considering the feeble condition of the patient owing to his heart-trouble, and the aid to his sight that followed the use of the eserin, and also the fact that his place of residence is but a few miles away, so he could get surgical relief without delay, if necessary, an iridectomy was not advised.

Mr. W. was seen at frequent intervals, however, till the 17th October, when he came last. His vision was normal for distance and he read Snellen .50 easily with + 2. But the field of vision has become contracted upwards and inwards (perimeter not used),

Through the narrow pupil no excavation of the disc was recognized. Anterior chamber still shallow. The eserin had been used (one-half strength) nearly every day. On some days two or three instillations (full strength) were required to allay the pain, which was very acute at times and was accompanied by a dull pain in the left eye. Prismatic colors were often observed, but only while the pain lasted. Both eyes were free from redness. No adhesions between the iris and the lens-capsule, as occasionally occurs, though the sulphate had been used almost continuously for over five months.

Had Mrs. W. been in health, an operation would have been performed early, but if the field of vision should continue to narrow, even then it is likely there will be useful sight so long as it will be required.

The history of the second case is as follows:

7th October. Mrs. B. aged 69 years, a native of Massachusetts, was led into the consulting room to make arrangements for the removal of her "cataracts." Absolute glaucoma of the left eye with no perception of light. Fingers at 0.50, right, T+ 3 both. Good projection, right. No view of either fundus, hence her physician might all the more easily believe the lenses were opaque. O. S. very painful, one hour, six months ago, followed by loss of sight within forty-eight hours.

Constant pain in right eye, brow and temple during the last

three weeks. Eye red and tender and the usual external signs of glaucoma were present. Eserin sulph. was used O. D. (0.05:10.0) and in an hour its myotic action was marked on the iris, though with a considerable degree of pain that cocain did not lessen—but the vision did not improve. She was ordered to use the eserin and report after forty-eight hours.

9th October. Patient could see better in two hours after her return home and an hour later she could tell the time of day. The eye ached all the night, preventing much sleep. Eye is still red. Anterior chamber deeper; pupil fairly contracted. T + 2 (?) V.=Sn. 18, at 4, and Snellen 8. with + 2.5 D. and with + 6 reads Snellen .50.

Eserin no longer painful. Fundus normal. V. O. S. quiet. —no red reflex. To use eserin trice daily in both eyes. No pulsation of vessels.

1st. Nov. No pain for a week. Colors, occasionally by lamplight T + 1 (?). Pupil of normal size—left is still dilated but the left disc is visible and is deeply cupped and is of a blue white color. No sight. Snellen 8. at 4 meters, O. D. +. .75 gives Snellen 6. (+ 5. D.=.50). Redness gone. Field of vision normal but with marked cupping of the disc in spite of the improvement in sight. As is apt to be the case in glaucoma, when there is no pain, the idea of operative interference was not entertained by the patient. But if the disease should progress and the sight should fall away, it is probable that it may yet be acceded to. In the meantime, the use of the eserin is to be continued.

It may not be inopportune to refer to the writer's somewhat limited experience in the treatment of glaucoma. Instances of this disease occurring in hospital patients have been exceedingly rare. Out of several cases of the simple form in but one has permission been granted to perform an operation (a sclerotomy, which seemed to arrest the progress of the disease while the patient lived) although, with increasing loss of sight, an iridectomy has been repeatedly and urgently advised.

In a few patients suffering from chronic glaucoma, an iridectomy relieved the pain and the existing sight was retained, and in some it was improved. Had not several of these cases been

treated to long for "neuralgia in the eye" the gain in vision would, doubtless, have been much greater, of which the following may be taken as an illustration (which was one of the two practically-acute cases in which an operation was performed).

June 25, 1880, Mrs. M., aged 56 years, native born, had her left eye removed, it being staphylomatous and painful. Read Snellen 4, O. D., with + 1.5 at 4 metres.

March 23, 1883, Mrs. M. was taken with severe "neuralgic" pain three weeks before at 7 P. M., in her remaining eye and in half an hour she could see only shadows. Her physician (homoeopathic) wished her to see an oculist, but on her refusing, he gave her pills of "morphine" and later some "quinine," so her daughter stated. Pain constant in eye and head, preventing sleep. Nausea and vomiting a few times. She lived twenty-five miles out and wished to see me. On reaching her home late in the afternoon, the pupil was found widely dilated, T+3. Eye-ball very red. V. quantitative. Being limited for time and also for daylight, eserine was at once instilled, ether given, and satisfactory iridectomy made upwards, a light dressing applied, the frightened relatives recalled and the after-treatment of the eye was explained to the one having the clearest head, and all was over in less than an hour.

Daily reports of the case were received by post. The patient slept for three days after the operation, so great was her relief from pain. 7th May. Mrs. M. walked into my office. Her former H 1.5 had changed to My.—1.5 with which she read Snellen 18 at 4. With +4, she read Snellen 1.25. No cupping of disc, which was rather pale as from atrophy of the smaller vessels. Field of vision deficient up and out. No pain or redness. T+1. Status unchanged when last heard from.

WAS IT TABETIC ATROPHY?

BY HENRY B. YOUNG, A. M., M. D.

Cases of primary or simple atrophy of the optic nerve are, *per se*, no longer curiosities to the average ophthalmologist. They are unfortunately seen too often, present ophthalmoscopically too uniform a picture and afford too little encouragement for treatment. But the interest in them as indicators of some grave cerebral or spinal trouble constantly increases as more thorough investigation shows a more definite relationship. Some of these relationships have already been mapped out and described; and perhaps none better than that with *tabes dorsalis*. But others yet require the evidence of additional facts as illustrated in numerous individual cases, and to a certain extent it remains to be seen whether the apparent exception can be made to conform to the rules already laid down, or will prove subversive of them.

In this connection I desire to report the case giving rise to the initial question.

Flora S—, aged 8 years, daughter of a farmer in very moderate circumstances, was brought to me December 29, 1883, on account of declining sight which had been complained of by the child for four weeks only, although the family had noticed for perhaps three months that she did not see well. I was at this time just recovering from a week's illness and too weak to examine her properly, so merely noting that she had $V = \frac{2}{L}$ and $\frac{2}{R}$, and that she was apparently well nourished though rather pale, asked that she might be brought another day. Twelve days later (January 10, 1884) I saw her again. Vision was now reduced L. to $\frac{2}{C}$ and R. to perception of light and that only at one little spot in the upper and outer part of the field. The ophthalmoscope showed whitened discs and white lines along the margins of the larger blood-vessels, but no marks of any in-

flammatory process whatever. The color sense was practically abolished. The diagnosis was plainly atrophy, but what caused it? Schmeichler's paper on eye complications in *tabes dorsalis* was fresh in my mind (just published in the *Archives of Ophthalmology*) and it occurred to me to test the patellar reflex. I did so and found that there was *no* patellar reflex. This led me on. But I found a fair tactile sensibility and normal locomotion; and I could not get any reliable history of shooting pains in the lower extremities or constriction about the abdomen. I prescribed potassium iodide on general principles and gave an unfavorable prognosis—suggesting in a note to the family physician that he should seek further for systemic disease, and at the same time look up the family history.

Twenty-three days later (February 2d) I saw her on her return from St. Louis where she had been taken to consult Dr. John Green. Vision was now reduced L. to $\frac{1}{6}$ and R. *nil*. Dr. Green discovered nothing new in the eyes, but found Hutchinson's teeth (which I had unaccountably overlooked) and thought that they were more significant of a central cause than the absence of the patellar reflex.

Forty days later (March 12) I saw her for the fourth and last time. The left eye could now count fingers with difficulty at three inches—right eye as before. There was complaint of occasional pain in the head and below the knees. With the eyes closed the body swayed a little in an attempt to stand quietly. The soles of the feet were susceptible to tickling; she walked well and buttoned her dress with ease and accuracy. The diameter of the pupil was 6 *mm.* with complete iridoplegia, and the right eye was divergent. I have since learned that she was in a short time absolutely blind. The family then moved to the western part of the state and I lost track of them.

Briefly summed up we have *for* a diagnosis of beginning *tabes* the optic nerve atrophy progressing rapidly to completion; lack of association of the movements of the eyes; complete iridoplegia; absence of the patellar reflex and complaint of transitory pain—although too much confidence should not be placed on the patient's statement to this effect at the last interview and for obvious reasons.

Against the idea of tabes there is age and sex (unless Hirschberg's cases disprove the prevailing belief that tabes is to be found only in adult life); fair tactile sensibility; good control of legs and arms, and mydriasis.

Of syphilis (to which the teeth would point) it only remains to be said that no knowledge can be had of its common expressions in either parents or grandparents; and they have been interviewed, each one singly and alone and its influence fully explained.

ON THE INSPIRGATION OF POWDERED JEQUIRITY
IN CASES OF TRACHOMA.

BY ADOLF ALT, M. D.

A number of rather disagreeable and even very bad results which I had been unfortunate enough to obtain by the different methods introduced by DeWecker and others of using an infusion of the decorticated and powdered jequirity bean, had made me very sceptical with regard to this remedy, when I accidentally read a notice somewhere, that, I think, Dr. Cheatham, of Louisville, was using inspersion of powdered jequirity with great success. I thought this a very happy substitute for the infusion and have since given it repeated trials. The success has in all cases been complete, and this was undoubtedly due to the possibility of almost accurately dosing, and even almost localising the effect by using the remedy as a powder. I have never dusted it into the eye, as we do with calomel, etc., but have applied the powder with a brush directly to the locality, where I wanted it to act more especially. Its effect can thus be confined to one lid and even to a portion of one lid, if it is carefully applied. Another great advantage which this method has is, that the inflammation does not come on as vehemently as when the infusion has been used and never reaches the same height. I have not confined its use to old cases of trachoma only, but have used it also in more recent cases where the granulations were as yet quite succulent; however, I but very seldom used it where the cornea was as yet totally intact.

The following cases I select from my records to illustrate the foregoing statements.

CASE I. N. F., servant, 18½ years old, came to see me first on account of trachoma during June, 1883. Both upper and lower lids were studded with granulations, both corneæ clear. I

treated her for some time with sulphate of copper in substance, which was followed by a slight improvement. She then disappeared from my office until November, 1884, when she returned (having been treated elsewhere meanwhile) with slight pannus of the left and a macula in the right cornea, considerable irritation and photophobia. All of these symptoms gave way very promptly to the treatment with sulphate of copper in substance, but relapses occurred again and again and new portions of the corneae became involved. She had finally to give up her place as servant and I then determined to try the inspergation of jequirity powder. One application to each lid sufficed to produce what thus far has proven to be a complete cure. The granulations, stillieidium, photophobia and pannus have disappeared and her sight is normal in the left eye at least, the right being considerably impaired by the unchanged macula.

CASE II. H. L., farmer, æt. 24. Patient had sore eyes two years previous to his first visit to me. About two months ago had severe pain and inflammation in both. When I saw him there was an enormous trachomatous inflammation, more especially in the lower lids. The left cornea was very hazy and a portion of iris protruded through its outer upper quadrant. V. L. E. = $\frac{4}{c c}$; R. $\frac{1}{L X X}$.

Jequirity powder was dusted into the right eye. The croupous inflammation was well developed on the second day and when it gradually disappeared the granula had each singly the grayish look of the croupous membrane. All the granula which appeared thus changed, disappeared totally in the following two weeks. A few being left unaltered, these were dusted again with the powder and disappeared also. After abseision of the prolapse had been performed on the left eye, this was treated in the same manner and with the same result, two applications of the powder sufficing to do away with all granulations and to clear up the cornea quite markedly. Five weeks after I had begun treatment I was able to discharge him with no granulations and V. R. E. $\frac{20}{x l}$ (small macula) and L. E. $\frac{20}{c c}$.

CASE III. E. M., æt. 15, had been under my care for something over nine months on account of trachoma especially of the upper lids, with gradually progressing ulceration of both cor-

neæ and formation of pannus. Cuprum sulphuricum, yellow oxide of mercury, etc., had been applied without any real benefit. The granulations were so succulent that I was afraid to make use of jequirity. But when only a small portion of the pupil downwards remained covered by clear cornea, I did not hesitate any longer and applied the jequirity powder. The effect was an excellent one. The girl, who could neither raise her head nor look at anything without suffering severe pain and causing severe lachrymation, can now walk with head erect and open eyes, in short, is cured. Only small nubeculae remain in the upper third of the cornea. In this case, as in all since my attention has once been drawn to it, the grayish infiltration of the, so to speak, doomed granula was very pronounced.

It would be tedious to relate any more such cases. The conclusions, my experience with the inspersion of jequirity powder in cases of trachoma, has thus far brought me to, are the following:

1. That the inspersion of jequirity powder seems to be a much safer method than the methods usually made use of with this remedy in cases of trachoma.

2. That its effect can well be dosed and confined almost to a small portion of a lid (especially of the lower one).

3. That, in order to manage this effect in the way just mentioned, the powder must be directly applied to the parts to be affected by it.

4. That a peculiar gray infiltration of the granula will, a few days after the inspersion, give an idea what number of granula are going to disappear, and how many about may be expected to remain behind for further applications of the powder.

5. That, since having used the remedy cautiously in the manner just described, I have seen nothing but good and excellent effects from it, and especially in cases in which I should not have dared, from former experiences, to use the infusion of the jequirity bean.

TRANSLATION.

The following communication concerning the *transplantation of the eye ball* has been made by Dr. Chibret, who it seems is the first one to have claimed a successful performance of this operation, to the *Revue générale d'Ophthalmologie*.

I think it is useful to turn once more to a subject which has excited enthusiasm with some, scepticism with many, and which anyhow has been sympathetically accepted by the educated public.

In fact, the scepticism I have encountered, and especially from the colleagues not practicing ophthalmology, is far from wounding my feelings; it has flattered me particularly to see that the actual evolution of surgery had not yet prepared the minds in such a manner as to accept easily the transplantation of an eyeball.

I have asked myself why the idea to try such an operation had not until now come into anyone's head, and I found the reason to be the following:

We begin the physiological experiments on animals before we try them on man. I have tried to follow this logical manner and have had to give it up on account of material difficulties.

The rabbit, our common sufferer, has such a rudimentary capsule of Tenon that after enucleation I found it impossible to find it again in order to stitch the eyeball into it, as I had proposed to do.

With other animals the transplantation presents great difficulties and necessitates special arrangements; moreover, we have always to count with accidents which happen after the operation from unrest of the animal, and which may modify the result.

I had thought of using the monkey, as he is most similar to man, but it is difficult to procure large monkeys, and their indocility is well known.

At this period of my trials and reflections an idea entered my

head which was surgically speaking paradoxical but in fact logical and mother to the performance of the operation of transplantation.

If a gardener wants to transplant a tree successfully, he looks for soil which embraces the best conditions of vegetable nourishment. The chances of success are the better the more the nutrition of the tree gains by the change of soil.

Taking this into consideration and going even so far as to neglect the differences of order and species, I thought the rabbit's eye, which is badly equipped, (!Translator) and nourished in its rudimentary capsule, would find in the human and well developed capsule of Tenon, a favorable soil for its nourishment after having been transplanted.

This conviction having once become deeply seated in my mind, I waited for a favorable occasion and resolved to make use of it.

I must, however add, that the first idea of such a transplantation suggested itself to me in consequence of the excellent results which the irrigations with a corrosive sublimate solution of one in 2000 give after an enucleation. With this remedy the capillary haemorrhage is arrested, the surfaces become rosy and free from blood-clots. Union, therefore, takes place in twenty-four hours and without suppuration.

I could not keep myself from thinking that it would be to be regretted not to make use of these excellent conditions, and I determined to attempt the union of the capsule to another eyeball instead of allowing it to collapse and thus grow together in itself.

There was no use in thinking of transplanting an eyeball from man to man; this could only be had from people sentenced to death. There remained nothing but the eyeball of an animal.

These many considerations; slowly ripened during several months, have brought us to perform on the 4th of May, 1885, the operation which was published in the *Revue générale d'Ophthalmologie*. My excellent friend, Dr. E. Meyer, who knew of my researches, was the cause of my no longer keeping them secret, and the thought that the whole world could be benefited by it, led me to the publication.

Without again going into details, I wish to give my actual thoughts concerning transplantation.

The results, thus far obtained, have been: 1. Perfect union between the eye of a rabbit and Tenon's capsule in man. 2. Motility of the eyeball on the fifth day, when the sutures were removed. 3. Perfect restoration of the sensibility of the cornea on the tenth day, although not even a slight sensibility was to be noticed the evening before. 4. Conservation of the transparency of the refractive media, and especially of the crystalline lens, until the sixteenth day.

On the other hand there were some corneal ulcers produced by the pressure of the thread at the limbus, and finally necrosis of the cornea was the result. The now unprotected iris was then necrosed in turn, giving rise to a prolapse of the crystalline lens. Thus I had occasion to rupture the anterior lens-capsule and to extract the transparent crystalline lens without prolapse of the vitreous body which also had retained its transparency.

A fortnight later on the loss of substance due to the necrosis of the cornea was refilled by cicatricial tissue and the patient could go home.

I want to draw particular attention to the well pronounced and rapid return of the sensibility of the cornea on the tenth day. What we have been taught by the optico-ciliary section, did not seem to warrant a similar result.

For future operations we will have to change the operative procedure in such a way as to prevent the contact between the cornea and the sutures. I was content with inserting the cornea within the borders of the human conjunctiva, lined with the capsule, and I obtained this result by one suture "*en bourse de roulier*" as it is used after enucleation.

It will be well to preserve the conjunctiva around the limbus on the animal's eyeball, to unite that with the free edges of the human capsule, and, if it should be necessary to add a suture "*en bourse*" in order to fasten the eyeball better, this suture must pass between the cornea and the equator so as to keep away from the cornea and to avoid the accident which has been the obstacle to the complete success of my operation.

The subject is full of questions which cannot be answered.



What will become of the transplanted eyeball? Is it necessary to confine ourselves to rabbit's eyes?

I have thought of pig's eyes, which are considered to be much like human eyes. I have enucleated a number of them from small and large animals. They have a well developed capsule of Tenon, but their cornea is enormous; their diameters exceed those of the human cornea by four or five mm. The eyeball is a little more voluminous than the human eyeball. These conditions are not very favorable. In fact, the animal's eye must easily fit into the human capsule, and it must therefore be smaller than the enucleated eyeball, because we have to take into account the retraction of the capsule.

The rabbit's eye is in very favorable conditions for transplantation. In spite of the distance which severs the rodents from man, my operation shows that it is possible to use them successfully.

When about to finish these pages—and the reader will easily divine with what conclusions they should have ended—I received a letter from my patient telling me of severe pains in the transplanted eye, in the forehead and in the temple on the same side. These pains have lasted for three weeks (from the 20th of July to the 10th of August), and there was an abundant suppurative discharge. A little time after I had occasion to examine the patient and I could feel the shrunken sclerotic of the rabbit's eye. The cicatricial tissue, which contained lime deposits and which had filled the opening caused by the sloughing of the cornea, must have been eliminated by suppuration. Might this not have caused a sympathetic inflammation? Could it not have become necessary to remove the eyeball which had been transplanted so carefully? These questions arise in my mind and do not allow me, for my own part, to make further experiments on man. At the same time I think it my duty, after having initiated this transplantation, to say a warning word from the moment that I am aware that there may be some danger in it. I think I am free from reproach in my case, but my conscience would not be quite easy, if I should allow myself to make new attempts.

I think it quite possible to experiment and collect numerous experiences on animals, as the pig, dog and rabbit. By then al-

lowing the animal on whom the operation has been successful to live, we would find out what becomes of the eye after several months. If the transplanted organ remains intact, then we will have a right to return to man.

I, therefore, think that this question should be transferred from the clinic to the laboratory.

Since I have neither the time nor the necessary surroundings, I leave the further advancement of this question, which promises to be so rich in scientific and practical results, to those who are in better circumstances for doing it.

CORRESPONDENCE.

The following letter is of interest in connection with Dr. Young's paper in this number.

DEAR DOCTOR.—Since writing the report which I herewith enclose, I have accidentally heard indirectly that the child's health is gradually failing. But I have also heard where the family is located and propose writing to a professional friend of mine in that neighborhood to see the case and report to me the general condition.

May be the evidence which can now be had will settle the question of etiology beyond peradventure.

Very truly yours,
H. B. YOUNG.

BURLINGTON, IOWA.

DEAR DOCTOR.—In your last issue of the *AMERICAN JOURNAL OF OPHTHALMOLOGY*, p. 210, I notice a "peculiar formula" for a glass, by Dr. Fox.

The vision obtained by the glass (+ 10 D s. \bigcirc + 3 D cy. ax. 180° \bigcirc + 2 D cy. ax. 50°) is excellent, but allow me to say that practically a sphero—cylinder will answer the same purpose: viz: + 11 D s. \bigcirc + 3 D cy. ax. 15° .

The two + cylinders, + 3 D cy. ax. 180° \bigcirc + 2 D cy. ax. 50° , in Dr. Fox's "peculiar glass" are neutralized by a — 1 D s. \bigcirc — 3 D cy. ax. 15° , which everyone can verify with trial lenses, and there is no doubt that the above glass (+ 11 D s. \bigcirc + 3 D cy. ax. 15°) will give the same vision (Perhaps the axis of cylinder is a trifle more or less than 15°).

Respectfully yours,

DR. PAUL B. WALDMAN.

READING, PA.

ADOLF ALT, M. D.:

Editor American Journal of Ophthalmology.

Dear Sir: I notice in your journal for October, 1885, a correspondence in relation to the production of a lens from a formula calling for a bicylindrical and spherical surface, which Dr. Fox had found necessary for a case, and reported by him at the last meeting of the American Ophthalmological Society. I was not at the meeting and was unable to state that such a pair of lenses or spectacles had been made for me by J. L. Borsch, Esq., of Philadelphia, in December, 1881; the patient was seen at the Eye Clinic, Jefferson Medical College Hospital. Similar lenses have been provided for cases by Mr. Borsch since then.

Prior to this time I had been unable to provide cases of mixed astigmatism requiring a presbyopic correction with a spectacle combining both corrections. My first case was with the plus and minus cylinders at right angles, and the presbyopic correction added; he could have had a spherocylinder lens, but he preferred the action of the bicylindrical surfaces with the plano-spherical surfaces added, and it gave me an opportunity to try what Mr. Borsch so ingeniously devised for me. In the cases since provided with these formulas, the angles of the plus and minus cylinders have been other than at right angles to each other with the plano-spherical added. I presume the spectacles made for Dr. Fox by Mr. Borsch are on the same plan as those he made for me, and as your correspondent asks Dr. Fox how such lenses are ground, I leave him to answer. Claiming for myself an earlier production of such a lens or spectacle for the advantage of correcting cases of mixed astigmatism (irregular?) with presbyopia, where the plus and minus cylinders are not at right angles to each other, and no spherocylindrical combination will give an approximate or the same result,

Very respectfully,

WM. L. LITTLE, M. D.

PHILADELPHIA, PA.

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CASES OF GLAUCOMA OPERATED UPON BY C. R. AGNEW, M. D.

REPORTED BY DAVID WEBSTER, M. D., NEW YORK.

CASE I. TREPHINING THE CORNEA FOR THE RELIEF OF PAINFUL GLAUCOMA ABSOLUTUM; SUBSEQUENT ENUCLEATION.

Oct. 28, 1875.—Mrs. C. K., aged 64, began to use glasses at the age of thirty, but has not changed them for stronger ones more than three times. Otherwise, her eyes never gave her any trouble until a year and a half ago when she began to have occasional attacks of “siek headache” with pain in and radiating from her right eye. She does not know that there was any blurring of sight during these attacks. About a year ago she first observed that the attacks were accompanied by redness of the right eye. She does not know whether the sight was impaired or not until the last attack, eight months ago, which was much more severe than any that had preceded it. The pain has continued, without intermission ever since, and she has taken opiates daily with only partial relief. The eye lost all perception of light some six months ago. She never observed halos about lights.

The eyeball is injected, the cornea insensitive and ulcerated at its center, the pupil dilated and fixed, the iris pressed forward so as to be nearly in contact with the cornea, the tension much

increased and the media so opaque that with the ophthalmoscope only the faintest tinge of red is seen in the reflex from the fundus. Left eye, vision = $\frac{20}{x \times x}$ with $+\frac{1}{18}$; visual field normal, tension slightly increased, pupil a little sluggish. The left eye has been "weak" for some time, and the patient wears dark blue coquilles and inclines her head forwards with a fixed scowl. The ophthalmoscope shows only very shallow excavation of the optic disk.

The patient was placed under ether and a disk removed from the center of the cornea by means of Bowman's smaller trephine. The aqueous escaping suddenly as soon as the cornea was perforated, the anterior capsule of the lens came in contact with the sharp edge of the trephine and some of the soft lens matter escaped. Absorbent cotton was applied and the eye bandaged. This was removed twice daily, the eyelids cleansed, and the dressing reapplied.

Nov. 24.—The patient has slept without anodynes and has had no pain in the eye or head from the operation until to-day. Applied two leeches to temple.

Nov. 25.—While stooping, last night, the patient struck her eye against the corner of the bedstead. The pain was very severe for a short time and then subsided spontaneously. The remaining nucleus of the lens was either forced through the only partially healed corneal wound or precipitated to the bottom of the vitreous chamber. The space between the iris and the cornea is partially filled with blood.

Nov. 26.—The patient was allowed to go home, although there still remained some blood in the anterior chamber.

January 4, 1879.—The patient returns, stating that a week ago she was attacked with bleeding from the nose which her family physician stopped with great difficulty. Ice was applied to her nose, temples and back of neck. Her attendants estimated her loss of blood at one quart. She thinks she caught cold in the eye from the ice, for two days later severe pain set in, in the eye, and her family physician has not been able to relieve it. The condition of the left eye is about the same as when first examined. $V = \frac{20}{x \times x}$ with $+\frac{1}{14}$. The right eyeball is hard ($T + 3$), the cornea ulcerated, and the anterior chamber obliterated.

The indications now seemed to point directly to enucleation. This was performed, the patient being under ether, and she went home at the end of a week.

May 21, 1879.—Dr. Francis Delafield, who examined the enucleated eye, informs me that he “did not find any lens at all in it.” This places beyond doubt the fact that the unabsorbed nucleus was expelled from the eye at the time of the injury, as was thought probable at the time.

CASE II.—Painful Glaucoma Absolutum of Right Eye with Chronic Glaucoma of Left. Enucleation of Right and Iridectomy of Left at One Sitting.

June 11, 1873.—Mrs. McK., aged 51, never saw very well with her left eye. Three years ago she was attacked with a very painful inflammation of both eyes. The right has been painful day and night ever since. The left has “pained all along some,” but very severely the last six weeks.

Status præsens: right eye, lens cataractous and pushed forward, hæmorrhage in the shallow anterior chamber, several ciliary staphylomata, eyeball very hard, no perception of light. Left eye, vision = $\frac{2^0}{L}$, visual field, at a distance of two feet, measures four and a half inches horizontally and four inches vertically. All that remains of the visual field is immediately below the point of fixation. Tension increased. The ophthalmoscope shows cupped excavation of the optic papilla 1.80 mm. in depth, arterial pulsation, and ring of choroidal atrophy around the disk. The media are transparent.

June 12.—Enucleation of right eye and iridectomy upward upon left, under ether. There was no bleeding into the coloboma, and the patient came out of the ether without delirium or vomiting.

June 13.—Upon recovering from the anæsthetic the patient rested quietly until midnight when she awoke with pain in the eye. The pain has continued, without remission, and the eye is slightly red. The pain has “quite left” the right side of her head.

June 14.—When the bandage was removed, this morning, there was some chemosis, and, although the anterior chamber was still empty, there was decided increase of tension. The

pain had been continuous, but less severe than the day before. Three leeches were applied to the left temple and after they had dropped off the bleeding was encouraged by hot fomentations for an hour. Iced cloths were then applied. At 5:30 P. M. the patient complained that the iced applications increased the pain. They were therefore discontinued.

June 15.—The patient took half a grain of sulphate of morphia last night and slept well. She says that she feels “shaky” this morning.

June 17.—The patient passed a very good night without anodynes. The eye shows less chemosis and less increase of tension. There is no pain. Perception of light remains. Ordered three leeches, atropine, and bathing with hot water.

June 22.—Eye looks very much better, but still has no anterior chamber, and only perception of light.

June 25.—Leeched again.

June 26.—Anterior chamber has begun to refill.

July 3.—The patient opens her eye much better and can distinguish large objects about the room. The media are transparent, the disk clearly visible, no hyalitis or detachment of the retina.

July 14.—Counts fingers at fifteen feet.

July 19.—Reads Snellen No. 30 at 18". Visual field $6\frac{1}{2}$ " horizontally and $3\frac{1}{2}$ " vertically, as measured at two feet.

July 20.—Media clear, tension slightly increased, disk still cupped as before the iridectomy, vision same as yesterday.

The patient was now allowed to go home, with a letter to her family physician. About two years later we learned that she had become totally blind.

The enucleated eyeball was examined by Dr. William Cheat-ham, who made the following report:

“Eyeball enlarged; ciliary staphylomata; anterior chamber very small and partly filled with blood. Lens pushed forward. Posterior chamber enlarged and divided into three parts by funnel-shaped detachment of the retina. Two-thirds of posterior chamber, that part between the retina and the choroid, filled with finely granular, structureless exudation; the other third em-

braced between the detached retina and the lens, and occupying the ciliary staphyloma, contains the vitreous body in a state of myxomatous degeneration. The retina is partly in a state of colloid degeneration, and has partly undergone connective tissue degeneration. Haemorrhage in canal of Petit."

CONGENITAL DERMOID TUMOR ON THE EYE.¹

BY S. POLLAK, M. D., ST. LOUIS.

The patient is 38 years of age, of perfectly healthy parents. His mother—a very intelligent obstetrician—noticed a black spot, the “size of a coffee ground,” soon after his birth, which never left him. When he was five years old, the parents consulted me about it. I must have considered it a myoecephalon, that is, a protrusion of the iris through an opening in the cornea, for I suggested to have it snipped off. But inasmuch as the pupil was quite free, and the sight not in the least impaired, the parents declined acceding to my suggestion. Nothing has been done to it, or for it, since. By the merest accident I saw him again last Sunday, the 8th inst. I found a tumor had developed over the black spot, and has been for many years in its present condition.

The tumor is situated at the limbus conjunctivæ, or more properly, it is located in the sclero-corneal margin of the lower outer quadrant. It is conical in shape, with a base of 8 mm. in diameter, and an elevation of 3 mm. It is of a pale, whitish-yellow color, has a smooth surface, and from its apex a stiff, white hair protrudes, about $\frac{1}{2}$ to $\frac{2}{3}$ of an inch long, which projects between the lids; it causes no irritation, and it does not impair the motions of the eye. The hair is firmly rooted in the tumor; it cannot be easily extracted with the fingers. This can best be accomplished with strong evulsive forceps. It grows soon again, and while yet short and stubby, it causes much irritation to the palpebral conjunctiva, but when it grows long enough to project between the lids, the irritation ceases. When, however, it is allowed to grow too long, it curves inwards, lodges inside the lower lid, and provokes considerable lachrymation.

1. Patient presented to the St. Louis Medical Society, Nov. 14, 1885.

The hair has to be evulsed about every three months, and though the bulbar end is extracted, the follicle remains intact, and the hair is reproduced.

The hair is nearly as often black as white, which is difficult to account for. The eye is sound, sight good, somewhat hypermetropic.

There is a crescent-shaped white line in the cornea, adjacent to the tumor, which may be either a fatty degeneration, like an arcus senilis, or a cicatricial opacity.

The entire structure bears a close analogy to that of the skin and is doubtless a *dermoid tumor*. This must not be confounded with a *cystic* tumor of the conjunctiva; the latter is readily distinguished by a circumscribed round form and its translucency, which is easily recognized by oblique illumination.

Dermoid tumors on the eye are not of very frequent occurrence.

Von Graefe exhibited one in his clinique in 1860, which covered over two-thirds of the cornea, was lobulated and very disfiguring.

Wardrop, in his "morbid anatomy of the human eye," mentions an extraordinary case, in which twelve very long hairs grew from the middle of the tumor, passed through between the eyelids, and hung over the cheeks; these hairs had not appeared till the patient was 16 years of age, at which time the beard began to grow.

Dr. Taliaferro, of Kentucky, has recorded in the "American Journal of Medical Sciences," 1841, an interesting case of a girl aged 15, who had a congenital tumor on each eye. The tumors were of a delicate pink color at their base, becoming brownish at their apices. The tumor on the left eye, at its base, measured five lines in one diameter by three and one-half in the other, and rose in a conical form to about six lines in height. It almost covered the lower two-thirds of the pupil. From the apex grew ten or twelve hairs, about sixteen lines in length and a shade darker than the cilia. The tumor on the right eye was in shape and position similar to the one on the left, but of about half the size, and covering only the lower sixth of the pupil.

The tumors were excised with excellent results.

Similar cases have been reported by Ryba (26 cases) Arlt, Graefe, Schweigger, von Weeker, Swanzy, Leber, Hildige, and others. A list of the papers on this subject may be found in Graefe-Saemisch, Vol. IV., Part 1, page 309, etc. (EDITOR.)

The excision of dermoid tumors can be readily effected, but care must be taken not to endeavor to remove them thoroughly from the cornea, as they sometimes extend deeply into the structure.

Whether the hair can be eradicated without destroying the follicle is doubtful. Electrolysis has proven effective in destroying the follicles of the cilia, but the risk of endangering the integrity of the eye must be seriously considered.

THE ACTION OF CYLINDRICAL GLASSES IN THE CORRECTION OF REGULAR ASTIGMATISM.

BY SWAN M. BURNETT, M. D., WASHINGTON.

The appearance of some papers and correspondence in recent numbers of this journal seems to show that there is yet lacking a thorough comprehension of the elementary conditions of regular astigmatism and of the method of its correction by means of cylindrical glasses. I may, therefore, be pardoned for calling to mind some of the fundamental principles involved.

In regular astigmatism where the refracting system is represented by an ellipsoid with three unequal axes *the principal meridians must lie at right angles to each other*. Whenever the refracting surfaces depart in any degree from this form, it ceases, speaking from a strictly optical point of view, to be regular astigmatism, though it does not follow that cylindrical glasses may not be of some advantage practically. There must, however, always remain under these conditions some amount of an irregular astigmatism which the cylinders do not correct.

Whenever two cylindrical lenses (+ or —) are placed with their axes at angles to each other the cylindrical refraction of the combination will be the *algebraic sum* of the two lenses, but the axis of this resulting cylinder will be different from that of either lens separately, and in most instances there will also be associated a spherical refraction.

It will be remembered that it was on this principle that Stokes made his well-known apparatus which enabled him to obtain with one + and one — cylinder, a constantly varying amount of cylindrical refraction with a constantly changing direction of the axis, on revolving them about a common center.

It is not necessary to enter here into a mathematical exposition of the matter, since any one can demonstrate the facts experimentally by means of the cylinders found in our test-cases.

Take, for example, the two cylinders used in Dr. Fox's case, $+3$ and $+2$. When the axes of both are at 180° the refractive result will be a cylinder of $(3+2) = +5$ D. axis 180° , and of course will be neutralized by a -5 cy. axis 180° . Now turn the $+2$ until its axis shall be at 155° , then for its neutralization there will be required -0.25 s. $\ominus -4.5$ cy., axis 172° (about). When the $+2$ cy. is further turned to 135° the combination can be neutralized only by -0.75 s. $\ominus -3.5$ cy., axis 160° , whilst when $+3$ stands at 180° and $+2$ at 90° , the neutralizing combination will be -2 s. $\ominus -1$ cy. axis 180° , since the $+2$ cy. now takes $+2$ from the 3 to form a $+2$ spherical, leaving only a $+1$ cy. axis 180° .

It is thus demonstrated experimentally that it matters not at what angle the axes of the $+$ cylinders stand to each other, the result of the combination always amounts to a cylindrical or sphero-cylindrical refraction, which can be represented by a plain cylinder or a sphero-cylinder, the cylindrical action diminishing and the spherical increasing as the axes approach to right angles.

Dr. W. S. Dennett, of New York, has constructed a very ingenious modification of Stokes' lens which enables one to read off on the apparatus without the trouble of calculating, the exact cylindrical refraction of a concave and a convex cylinder when revolved about their common center, together with the direction of the axis of the combination at all angles of crossing of their individual axes. But even the fertile brain of Dr. Dennett has not yet furnished us with the amount of the varying spherical refraction for each of those positions. When he does, his apparatus will be a most welcome addition to the armamentarium of the ophthalmic surgeon.

The lenses used by Dr. Fox and by Dr. Little can have no advantage over sphero-cylinders which they indeed are; and it should be easy for Dr. Little to reduce any crossed cylinders combined with a spherical to a sphero-cylindrical lens having their exact optical equivalent. Moreover it is apparent that if these are cases of regular astigmatism with the principal meridians at right angles to each other the axes of the correcting glasses must also be at right angles to each other. If, however,

they are cases of irregular astigmatism, it becomes an entirely different matter, though always any combination of cylinders can be reduced to cylinders or sphero-cylinders.

In regard to the grinding of the kind of lenses spoken of by Drs. Fox and Little, we do not conceive it possible that the optician has actually attempted to grind two cylinders on one surface. If he has done so he cannot have succeeded, for it must be apparent that in grinding the second cylinder the essential cylindrical character of the first lens must inevitably be destroyed. A single surface can not have two perfect cylinders, except when their axes are at right angles, any more than a single surface can have two spherical curves. We more than half suspect that Mr. Borsch is a clever optician as well as optician and has not tried to grind these two cylinders at oblique angles on one side of the lens, but has simply given the optical result in a sphero-cylinder. But even if he could so grind them, we think we have clearly shown that it would be labor spent to no purpose.

In conclusion, we notice the very remarkable statement of Dr. Culbertson in the October number, page 212, in which—if we understand him aright—he asserts that the cylinder which corrects a simple myopic astigmatism for distance, does not correct it for near vision.

“By this—glass the myopia in proximal vision has been simply transferred from one to the other plane, and the foci of the two planes are not of the same length.”

We think there must be a mistake somewhere, either in our interpretation or in the doctor's expression, for we cannot conceive how such a state of things would be possible, with a normal accommodation acting on all the meridians at once. When a simple myopic astigmatism is corrected for distance, the eye becomes optically emmetropic with all its meridians the same, and accommodation must act upon it exactly in the same manner it does upon an emmetropic eye.

TRANSLATION.

The following report of an address made by Dr. Haltenhoff at the occasion of unveiling a monument in memory of the great Daviel and in the presence of a large number of the Swiss oculists, in the cemetery *Grand-Sacconex* at Geneva, Switzerland, on the 8th of October, is taken from the *Revue Clinique d'Oculistique*.

Before removing the veil which covers this stone, let me recall to your memory in a few words by what rights *Jacques Daviel* has merited the admiration and the thanks of posterity.

About the middle of the XVIIIth century the healing art had barely emancipated itself from the manacles of the scholastic tradition so almighty in the middle ages. The progressive movement which was destined to create a new branch, that of the natural sciences, had, it is true, commenced, thanks to the labors of the great anatomists, but ophthalmology had scarcely been benefited by this progress and remained almost totally in the hands of ignorant charlatans. The most important operation in ophthalmic surgery, the cataract operation, was usually practiced by wandering oculists and on the public squares. It consisted in reversing and depressing the dim crystalline lens into the fundus oculi by means of a needle, in order to free the pupil from it. This operation was usually immediately successful, the patient recovered sight, but only too frequently this was soon followed by a chronic inflammation of the eyeball, and in most cases sight was lost under long suffering and without any hope for future improvement. Sometimes, even, the fellow-eye was also destroyed by sympathetic inflammation. A long series of centuries had, so to say, canonized the principle and the method of this operation, the results of which had not been altered by any notable improvement.

A young Norman surgeon, practicing at Marseilles, where he had gone when quite young to help those suffering from the

pest, was the first to rise against this old practice. He firmly declared that the cataract, *that is the sick crystalline lens*, ought to be extracted from the eye. He published a method invented for this purpose and with which he had good success in several cases. This innovation was little believed in, and was attacked in a lively manner by the faculties of medicine, the scientific academies and the journals.

Jacques Daviel accepted the fight with his untiring ardor and his innate energy, and produced new proofs. He abandoned the depression of the cataract altogether and practiced successfully several hundred cataract extractions according to his method. His reputation as an operator soon extended over Europe; distinguished physicians took his part; but *Daviel* had not the good fortune to see the triumph of his ideas. In full activity he was suddenly attacked by a grave malady, he came to Geneva to be treated by our celebrated co-citizen, Dr. Tronchin, and died in a hotel in our city, alone in a foreign country.

The fight between the admirers and adversaries of *Daviel's* operation did not die with him. It was only about the middle of our century that the extraction generally adopted, as the only normal cataract operation. The operative procedure and the instruments have undergone a good many modifications since *Daviel*, but the principle has remained the same. If to-day the cataract extraction is one of the most certain and most brilliant surgical operations, if every year thousands of blind people all over the world recover their precious sense of vision for the remainder of their lives, it is due to *Daviel*.

France is justly proud to have produced this eminent man. But, gentlemen, as science and charity have no fatherland, so is *Daviel's* glory universal and his name and his conquest belong to all civilized nations. Have we not here a striking proof of this maxim by the honor done his memory by the oculists of our country. The Swiss commune of the *Grand Saconnex* feels honored to-day to own what remains of *Daviel*. She will from now forth have to guard and to preserve this monument, the first that has been erected in honor of the great French oculist. We have no doubt but that our co-citizens of the *Grand-Saconnex* and the officers they have appointed will loyally fulfill their duty.

Though most of them are farmers and laborers, the inhabitants of this community will remember that in this cemetery rests a man, who also has been a great worker, a worker whose work has benefitted a great many of his race. * * * *

* * * The veil covering the monument fell and every one admired the remarkable work of M. Reverdin, who received the unanimous congratulations. * * *

Mr. Alfred Daviel addressed the meeting in the following words.

As a member of the family Daviel, and bearing the name of the one to whose memory you have erected the monument unveiled to-day, I feel it my duty to say a few words. I cannot do so without feeling considerable emotion. In fact, gentlemen, how could I help being deeply touched by the manifestation to which you so kindly have invited me and my cousin, Mr. Laignel-Lavastine to be present.

When quite young yet I have been taught by my venerable and regretted father, who related to me the details of his life, to admire the virtues of the surgeon whose merit you proclaim to-day, his patriotism, his ardor for work, his charity, his unlimited love for humanity, and particularly for those that luck had forsaken. The beautiful engraving by Lemire, which I had before me from my infancy, often attracted my attention, and I knew by heart the verses which were written on it, and by which a cured and grateful poet had celebrated the method invented by his operator. * * *

* * * The life of *Jacques Daviel*, his long labors, his refusal to the offers of Ferdinand VI. of Spain, his numerous cures, his charity and his talent as an operator, celebrated by Morant and Diderot, with all this I was made acquainted. I also knew that he had invented a method to operate for cataract. Was this invention destined to make his name immortal? It is yours to say so, gentlemen; yours, as men of science and as citizens of a nation which is a friend of France and of all that is noble and ideal—it is yours to say so, a few steps from a city which is justly proud of the great men whom she has brought forth. You ought to proclaim that, conforming to the beautiful *devise* of Geneva, *Post tenebras lux*, by you inscribed on this

monument, the method of operating for cataract by extraction invented by *Daviel*, has been justly taken from the grave of forgetfulness in which it had been buried for a long time after his death.

What a singular circumstance! *Jacques Daviel*, who himself had healed so many infirmities of others, came to your beautiful and noble country hoping to heal the disease which had attacked him, and died on your soil. According to his patriotic wish he was buried in French ground, and it so happened that in 1875 this ground, where he rested, was made a part of Switzerland.

Thus the last wish of *Jacques Daviel* has ceased to be executed.

His family, gentlemen, cannot mourn this fact after what you have done. Does she not know, as the whole France, especially since the cruel trials she has undergone in days of sorrow and misfortune, how hospitable is the Swiss soil to the Frenchmen? She knows your especial reverence for those who have done some service to science and humanity the religious care with which you guard the memory of great men, wherever they were born.

The zeal with which you have erected this monument, as soon as by Dr. Haltenhoff's discovery you know that what remains of *Jacques Daviel* was resting here, the emotion with which this community accepted this trust, show clearly with what piety you will preserve it too.

In the name of the *Daviel* family I thank Dr. Haltenhoff who has initiated this movement, the committee of Swiss oculists who have brought to such a good end the task that they had imposed upon themselves, and the honorable and intelligent administrator of this community, who has helped the organizers of this ceremony, which we shall never forget, in the most active and most useful manner.

I could not end without congratulating the artists who have conceived and executed the work which we admire at this moment.

Thanks to all of you. In fact, only through you am I enabled to lay on his grave the homage due to his memory in the name of the family of *Jacques Daviel*.

CORRESPONDENCE.

 PHILADELPHIA, November, 1885.

F. F. C. Van Allen, Esq.:

DEAR SIR.—In answer to your query published in the October number of the American Journal of Ophthalmology, I would say that John L. Borsch, optician, 1324 Walnut street, ground the glass asked for by my formula as follows: A *concave* disk or mould of brass metal was made having two curvatures, short curve, axis 108° radii equivalent to thirteen dioptries, long curve, radii = ten dioptries. The flat surface of a piece of glass ground by a horizontal or rotary motion (the two movements applied in grinding spherical and cylindrical glasses) would not conform itself to this disk, but by applying a *pendulum* movement through the long diameter of the disk the glass is shaped whose refractive surface at 90° represents + 10 dioptries, and at $180^\circ = + 13$ dioptries—which would be equivalent to sph. +10° = cyl. + 3°, ax. 180° . The under surface of this glass is ground on a cylindrical disk, whose radii represent two dioptries at an angle of 50° . We now have a glass whose refraction on one surface is = + 10° \odot cyl. 3 D. ax. 180° ; on the under surface cyl. + 2°, ax. 50° and whose total refraction is equivalent to sph. +10 D. \odot cyl. + 3 D. ax. $180^\circ \odot$ cyl. + 2 D. ax. 50° .

It is obvious that in making a glass of this kind the spherical and cylinder must be ground on one surface and the second cylinder on the under surface. By the introduction of the pendulum motion a glass was ground which could not have been made by the methods now in the hands of opticians.

Very Respectfully,

L. WEBSTER FOX.

Minneapolis, Nov. 12, 1885.

Dear Doctor:—Will you be so kind as to explain the following prescription in the next issue of the AMERICAN JOURNAL OF OPHTHALMOLOGY.

Minneapolis, Feb. 25, 1885.

Mrs. F. C. W.

O. D., 3.26 D., Spher.

O. S., 3.26 D., “

T. G. R., M. D.

What I wish to know is there such a lens as 3.26 D., and what is its equivalent in English inches?

I have never known of a lens made in the dioptric system as 3.26 D., 3. D., 3.5 D. and in some instances 3.25 D. are of course regular lenses, and as no standard trial case I have ever seen had such a lens in, I would like to know if such a lens is manufactured.

Can you also let me know how Dr. L. W. Fox had the lens mentioned on page 210 of September JOURNAL ground, as I read it, it is + 10 D \bigcirc cyl. +3, D ax. 180 \bigcirc cyl. +2 D ax. 50° (ground in one). One spherical and two (2) cylindrical surfaces on one lens. How was it done? You will greatly oblige me by explaining the above.

Yours Respectfully,

C. A. HOFFMAN.

3.26 D. is probably a *lapsus calami*.—(Editor.)

HYDROCHLORATE OF COCAINE.

McKesson & Robbins have now ready for free distribution, upon application, a second edition of their pamphlet, giving interesting notes on the uses and properties of this valuable local anæsthetic. It gives a record of important operations on the Eye, Ear and Throat, in Gynæcology and Dental Surgery, all conducted by eminent investigators.

We are now the largest American manufacturers of Cocaine, and our Alkaloid, Muriate, Solutions and Oleate can be confidently relied upon. We are enabled to assure the profession of this from the many accounts we have received of successful operations conducted under the influence of our Solutions and Oleates, made respectively from our own manufacture of the Muriate and the Alkaloid.

D. B. ST. JOHN ROOSA, M. D., LL.D., says:—"In my hands it has superseded ether in these operations. I am entirely satisfied with Cocaine as a local anæsthetic. I have found the preparation made by McKesson & Robbins as good as that from Merck's alkaloid."—Dec. 4, 1884.

CHAS. STEDMAN BULL, M. D., writes:—"I have used your solution in quite a number of cases, both as preliminary to various operations, and also as a local therapeutic agent, and have been entirely satisfied with it as a local anæsthetic. It certainly does all that is claimed for it."

HERMAN KNAPP, M. D., writes:—"I have tried a sample given me by Messrs. McKesson & Robbins, of New York, as their own make, which acted as well as Merck's."

"105 MADISON AVE., N. Y., Dec. 24, 1884.

Messrs. MCKESSON & ROBBINS, Fulton St., New York—*Gentlemen*—I take pleasure in informing you that the solution of Cocaine of your manufacture, which I have used quite extensively of late, has given excellent satisfaction, both as to its rapidity and regularity of action, and the lasting effect of the anesthesia produced. Where time is precious, rapid anesthetization of the cornea, or conjunctiva is an important factor in ophthalmic

surgery, and in this special field of usefulness, I feel confident your Cocaine is destined to receive its full share of commendation from the Profession.
Yours very truly, F. C. RILEY, M. D."

"439 MONTAGUE ST., BROOKLYN, Dec. 11, 1884.

It gives me great pleasure to say that I have used the preparation of Hydrochlorate of Cocaine made by McKesson & Robbins, in a great variety of cases of operations on the eye, with the most complete satisfaction to myself. The relief from pain on the part of the patient was perfect, and no statement can be made more enthusiastic than the facts warrant. ARTHUR MATHEWSON, M. D., Surgeon B'klyn Eye and Ear Hospital."

"123 E. 25th STREET, Dec. 10, 1884.

Messrs. MCKESSON & ROBBINS—*Gents*—The specimen of Cocaine which you left with me a few weeks ago, has given great satisfaction. I have used it in more than a hundred cases of all kinds of painful affections of the eye and ear, and in a great many operations upon the eye, such as cataract extractions, squint operations, and others, and the preparation has produced complete anesthesia in all cases.

Sincerely yours,
DR. MITTENDORF."

We have had very large demands for our Oleate of Cocaine, containing 5 per cent. of the Alkaloid. The Oleate possesses many advantages over the aqueous solutions, being more quickly and thoroughly absorbed, and not so readily diluted by the fluids with which, in practice, it may come in contact. These advantages are the more manifest in dental surgery.

For the convenience of the Profession, we have in very compact form, the following

COCAINE CASES.

CASE No. 1.—Two ½ ounce g. s. vials, McKesson & Robbins 4 per cent. Solution.

CASE No. 2.—Two ½ ounce g. s. vials, McKesson & Robbins 2 per cent. Solution.

CASE No. 5.—The same as No. 4, except that the glass stoppers of the vials are tapered and lengthened, so that the points reach the bottom of the vials, like acid-testing bottles, thus affording the most convenient and cleanly way of applying either Solution or Oleate.

CASE No. 3.—One ½ ounce, each, 4 per cent. and 2 per cent. Solution.

CASE No. 4.—One ½ ounce McKesson & Robbins 4 per cent. Solution; one ½ ounce McKesson & Robbins Oleate.

Each contains a medicine dropper and a camel's-hair pencil. These are procurable from your druggist, and from J. H. Chambers & Co., St. Louis.

In ordering Cocaine, in any form, please always specify "McK. & R.'s."

MCKESSON & ROBBINS,
NEW YORK.



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